APR 5

APRIL 1940

FOOD INDUSTRIES

HOMES OF FAMOUS FOODS . . . SWANS DOWN CAKE FLOUR, EVANSVILLE, IND.

IN THIS ISSUE:

War Troubles Beset British Food Processors

How Food is Frozen in the Northwest

A New Day in the Technic of Fat Frying

Pepsi-Cola's In-the-bottle Quality Control

Shooting the Troubles in Air Conditioning

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Contents for APRIL 1940

VOLUME 12 • NUMBER 4

FOOD TECHNOLOGY

New Discoveries and Inventions

Food Engineering
Humidifying Freezers to Prevent Freezer Burn 92

Beverages
Fruit Juice Fermentation 92
Centrifuging to Check Fermentation 92

Packaging
Aluminum Food Containers 92

Canning and Freezing
Natural Green Color Fixed in Canned Vegetables 93

Dairy Products
Advantages of Cooked Flavor in Milk 94
Preserving Cream with Salt 94
Gelatine and Sodium Alginate To Stabilize Ice Cream 94

Meats and Fish
Salt Inhibits Spoilage in Canned Meats 95
Freezing Increases Salt Uptake in Fish 95

Oils and Fats
Smoke, Flash and Fire Points of Soybean Oil 95
Butter versus Vegetable Oils 95

Milling
Flour Bleaching and Maturing 96
Hulling and Bleaching Rye 96

Pickling
Lactic Acid for Pickles—I 96

Miscellaneous
Egg Storage 96
Fatty Acids Inhibit Mold Growth 97

★HOMES OF FAMOUS FOODS

On the cover this month appears the plant where Swans Down Cake Flour is made. It is the factory of Igleheart Bros., Inc., Evansville, Ind., a subsidiary of General Foods Corp., New York

THIS MONTH

PROCESSING

Sixteen Things That Can Go Wrong With Air Conditioning 39
By C. I. Elliott

Clearing Up the Confusion About Sugar Sirups 42
By Leonard Wickenden

Wartime Control Troubles of British Food Manufacturers 44
By H. B. Cronshaw

Formulas by der Fuehrer 47

Short-Time Pasteurization as It Looks to the Health Officer 48
By Floyd M. Keller

A New Day in Fat Frying 51
By W. E. Broeg

Cake Baking Flow Sheet 53

How Foods Are Frozen in the Northwest 54
By F. W. Knowles

Germicidal Properties of Hot Paraffin—Part II 57
By F. W. Tanner and H. F. Lewis

Taking the Guesswork out of Pasteurizing 61
By C. S. Pederson

Schedule of Current Action on Food Standards 75

DISTRIBUTION

Prize Packages—Wolf Award Winners 59

Pepsi-Cola Gives Controlled Quality to 400 Franchise Bottlers 64
By Ivan C. Miller

Sell the Consumer "400" First 67
By Ivan C. Miller

Hints and Hurdles 69

Panorama-Painted Trucks Increase Food Sales 70

EVERY MONTH

Talk of the Industry 35
Automotive 70
The Food Industry News 72
Business Trends 78
Men, Jobs and Companies 81
Catalogs 84
Food Equipment News 86
Food Technology — Abstracts 92
Formulas for Foods 98
Books 102
Patents 102

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In THIS *Issue*

• BOOSTS INCOME 266 PER CENT

That's a good trick if you can do it. And Pepsi-Cola Co. did it—in four years, in the face of stiff competition and in none too good times. But the important thing is how the company did it, which we shall tell you. The revelation begins this month in a story about how controlled quality is maintained in the beverage distributed by 400 franchise bottlers. Turn to page 64.

• IT COULD HAPPEN TO YOU

If you use air conditioning, or ever expect to, you may as well profit from the mistakes of others. Sixteen things that can go wrong with air conditioning systems are related in an article by C. I. Elliott, Carrier Corp., Part I of which begins on page 39. Mr. Elliott gives the answers.

• MORE VALUABLE THAN GOLD

At the time of the Gold Rush in Alaska it was more important to get food to the men digging gold than it was to get their gold out. Under this condition the great frozen food industry of the Northwest had its conception. They've learned a great deal about freezing foods in the Northwest since. So we have asked F. W. Knowles, Northwest Baker Ice Machine Co., to tell our readers about it. Part I of the story starts on page 54.

• WHAT WARTIME CONTROL MEANS

Many American food manufacturers have wondered what their fate would be should *M* Day ever come in this country. That would be hard to say, but considerable light is given by the present experience of food manufacturers in Great Britain. There, the government has become the sole purchaser of most of the important food raw materials and, in addition, rigidly controls the manufacture and distribution of almost all foods. As a result, the British food manufacturer finds himself today faced with many problems to which he must find an almost immediate answer. What these problems are and some of the ways in which they can be met are told on page 44 by Dr. H. B. Cronshaw, widely known editor of various British food publications.

• AVOIDING THE HAZARDS OF HEAT

To kill living microorganisms in fruit juices and other liquids by heating, without damaging the fresh flavor, requires close control based on an accurate knowledge of time and temperature factors. Research to determine what these factors should be has been carried out at the New York State Agricultural Experiment Station. These studies showed that necessary temperatures are often lower than those now generally used. Turn to page 61.

In FORTHCOMING *Issues*

• NO BUGS ARE GOOD BUGS

Webs or weevils in the freshly opened package of breakfast food have a sad effect on the manufacturer's public relations. And like so many other things that have to do with public relations, improvement starts at home. If the package of cereal or other product is properly constructed and if the food leaves the factory without infestation of any kind, obviously there will be no consumer complaint from this cause. Experience with this method of attack on infestation is the subject of an article now in preparation.

• WORLD'S FAIR 1940

We have told you what food manufacturers did at the New York World's Fair last year to promote their products, and how and why they succeeded or failed. Now we plan to tip you off on what will be done at the Fair this summer. The big show opens on May 11. Read about the food exhibits in FOOD INDUSTRIES on May 1.

• THE PROCESS IS PROMISING

For years there has been a demand on shipboard and in tropical countries for milk and cream that would retain the natural flavor for long periods. So research on the keeping qualities of quick frozen milk and cream has been conducted at the University of California, the milk and cream being quickly frozen in cans by the method developed by Food Freezers, Inc. The results indicate that the method has a place in industry. The details will be published soon in FOOD INDUSTRIES.

• PROFITS FROM WASTE

Afflicted as they are with profit margins that are at best narrow, food manufacturers cannot afford to neglect any recoveries that can be made from waste products or byproducts of food processing operations. Realization of the greatest returns from such waste recovery demands in turn that the processing method used shall result in a product of highest value.

These facts are clearly brought out in a recent study of the drying of citrus cannery wastes for the production of cattle feed. The study indicates that the value of the product as a feed is influenced considerably by the drying and other processing methods used. Undoubtedly, further research will determine that like considerations apply in the recovery of other waste products for feeding purposes. This research paper will be published soon in FOOD INDUSTRIES.

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LAURENCE V. BURTON, Editor
Volume 12, Number 4 April 1940

The Talk of the Industry

» IF PEACE should suddenly come to Europe, the current business recession might turn out to be a blessing. With no war orders worthy of mention, cessation of hostilities could not result in any adverse effect on U.S. industry other than possible psychological effects.

» A NEW and readily understandable term applied to homogenized milk is "Jitterbug Milk." Apparently *Pacific*

Rural Press is the coiner of the term, in an editorial that denounces homogenization, or jitterbugging, as a deceptive practice because it does not have a cream line and looks rich to the last drop.

Well, it tastes rich, too.

» ALREADY the world is commenting on the exceptionally high cost of warfare. Great Britain, France, Germany and Japan each is now spending about two-thirds of its national income on war. Win or lose, all of them stand a good chance to go completely busted financially. After that, then what? A potential customer with no money does not buy very much except on credit.

» "EVENTS — not propaganda — are what change public opinion," says Arthur C. Nielson, who has spent many years in accurate measurement of public opinion. He is in a position to know whereof he speaks. From the foregoing it is easy to see why the basis of all good public relations is good deeds; not mere talk about it. Also why bad public relations resulting from unfortunate or unwise deeds cannot be talked away.

» IN DECEMBER it was remarked here that the figures showing the operating ratio of the steel industry were something of an indicator of things to come. "When steel production reaches a rate that is better than 90 per cent of the industry's capacity there is no place for it to go but down."

Down she went. But now it appears to have reached a leveling off place from which it may again turn up. Times are usually good when steel production is on the upswing. The important fact is, of course, increased consumption. And mill operating ratios are merely a rough—very rough—reflection of steel consumption.

» AN EXPLANATION of the thought or emotional processes of people who become active in organized consumer groups recently enunciated by a well known woman should give pause to many who wonder what it is all about. Said she:

"Many persons experience frustration of their economic hopes and desires. This frustration leads to resentment, and resentment takes the form of vindictiveness."

When the latter occurs, the organized consumer groups appear to delight in doing the things that perplex, bewilder and annoy the manufacturer.

» CONTINUED DROPS in the value of the pound sterling in terms of U.S. dollars makes more and more remote the possibility of substantial food sales to the Allies. This goes for the U.K., France and all their world wide possessions, including Canada. The only out from this continuing loss of U.S. markets is increased imports of goods from the belligerents.

» A RECENT AD entitled "Boss Wanted" appearing in a large newspaper is indicative of the thinking of young people in our times.

"Applicant (the prospective employer) must be intelligent, tolerant, progressive, liberal, and the owner of prosperous business, offering a golden future to a sterling prospect."

If there were only enough prosperous businesses to go around and give everybody prosperous employment, what a grand world it would be! Youth, however, seldom gives thought to the possibility of starting its own business that later may be prosperous.

Food Company Earnings

NOW that a flock of annual statements are available, it is clear that profits were fairly generously earned in 1939 by food manufacturing companies. Out of 57 reports on hand, covering nearly every branch of the food business, 38 concerns showed earnings larger than in 1938; 15 showed earnings smaller than in 1938; while four companies showed smaller losses in 1939 than in 1938. One company showed a loss in 1939 where it had a net profit in 1938.

The most impressive showing was made by meat packers. In fact, the meat packing business is now back to normal.

Many bakeries, facing rising flour costs, have found it almost impossible to sustain their earning position. Yet breweries, also large users of grains and taxed at higher rates than bakeries, have generally done better than in 1938.

Dairy companies, canners and carbonated beverage manufacturers also made a record that is quite gratifying.

On the whole, 1939 was a fairly satisfactory year, and 1940 is starting out with considerably more promise than had been anticipated.

Canned Food Export Increase Not Yet a Major Movement

JANUARY figures for exports of certain canned foods to Great Britain, as released by the Department of Commerce in mid-March, show some interesting and perhaps significant increases. Total exports of canned vegetables and juices to the United Kingdom in January of this year were 576,200 cases, compared to a total in January, 1939, of only 17,200 cases. For the seven months from July 1, 1939, to Jan. 31, 1940, exports of these same products to England amounted to 1,159,700 cases, compared to 273,800 cases in the same period of the previous year, an increase of 320 per cent.

Most of this great January rise was accounted for by increased shipments of baked beans, soups and tomato products, the beans showing an increase from 8,200 cases to 361,600 cases, soups from 100 cases to 82,400 cases, and tomatoes and tomato products from 100 cases to 109,500 cases.

In contrast to these increased shipments, which were confined to so few products, English purchases of American foods decreased in almost all other categories. This fact raises a question as to whether Great Britain has really commenced a major food buying campaign in the United States, or whether the wartime restrictions on food purchases, imposed in the fall of last year, will continue adversely to affect American exports. While the increases recorded are encouraging, it would be unwise to consider them as warranting any increase in food production beyond domestic American requirements. The wiser course will be to maintain present production levels, meanwhile watching carefully to see if the cat really does jump, and, if so, in what direction.

Hors d'Oeuvres

• Down in Jacksonville, Tex., they are building a Tomato Bowl, to be completed in time for the 1940 football season. The idea apparently is to catchup some of the pigskin's possibilities for revenue.

• *Not long ago we attended an all-pineapple luncheon at the St. Regis Penthouse. Everything on the Na Mea Ai (menu) contained pineapple. The luncheon started with He Alii Wahine He Ipu (regal cup) and ended with He Ulaula O Lo Hua A He Hala Ai He Ipu (pineapple gem and strawberry sherbert cup). Kope (coffee) and Ka Ki (tea) were served. And, oh yes, not on the menu but present were Clara Inter "Hilo Hattie" (Waikiki Girls). Some luncheon.*

• Hathaway Bakeries, Cambridge, Mass., helped the Finns keep the Bear at the back door and at the same time effectively promoted a new product. For every loaf of a new Finnish style bread sold by the Bakery 1 cent has been donated to the Finnish Relief Fund.

• *S. A. Moffett Co. uses this trade motto: "The Pick of the Pack Plucked at the Peak of Perfection." What, no Peter Piper?*

• Visitors at the New York's World Fair 1939 ate 10,659,000 frankfurters and 5,172,133 hamburgers and drank 3,000,000 cups of coffee. They must have been hungry for something besides knowledge.

• *Say Drs. James B. Naughton and G. N. Pierce, of the Stamford University School of Medicine, beer is one of the best known protections against trichinosis. Its mild alcoholic content is supposed to keep the larvae of the trichinosis germ from burrowing into the walls of the digestive tract. Have you been shot for trichinosis lately?*

• With meat packing under strict government control in Britain, bootleg butchers have become a problem. They have been selling meat on the sly to patrons who know the password. Steakeasies, no less.

• *Letter to the Editor—"Kindly send us any free printed matter that you may have which we can use in our school cafeteria." We never suspected that our stuff was good enough to eat.*

• If women understood business more thoroughly, they would realize that they are getting more than their money's worth when they buy a nationally advertised product, believes Mary I. Barber, president-elect of the American Dietetic Association. And if they knew how often business operates at a loss they'd know they were getting a "basement" bargain.

• *The Borden national magazine ads personalizing Elsie the comely cow, won an award for the agency handling the account. Yes, Elsie goes over with the housewife. She reminds her of a friend.*

• Riboflavin preserves the characteristics of youth, 'tis said. It is essential to growth in childhood and gives greater zest to life in adulthood. That is, it makes the young grow fast and the old go fast. F.K.L.

Wagner Act Revision?

ALL employers would prefer to see the National Labor Relations Act revised in an equitable manner. Indeed, it should be revised so that it will grant commensurate rights to employees and employers. But, even such a revision will not supply the remedies for the defects that now exist. To explain this statement, one need only quote the words of one of the better known U. S. Senators who once told us:

"I don't care how good the purpose, how carefully a law is written, nor how great is the need for a piece of legislation, if its administration is entrusted to a group of incompetents, the whole effort is worse than worthless. And if the incompetents are also biased, the law becomes an evil." He was speaking of this act and the administering board.

To one who is realistic in his thinking about today's problems, it is apparent that the theory of the Wagner Act is good, but the administration of the act is bad, in fact, awful. The revelations of the Smith Committee in the House are startling evidences of "boring from within." Yet what will come of the investigation? There is now a bill before the House, designed to change the powers of the board, which if enacted would do much to correct the inequities of the application of the Wagner Act.

Will it be enacted? It is not likely that a thing will be done about it until after the first Tuesday after the first

Monday in November. The United States is very short of real statesmen.

Direct Contact Needed

THE need for closer contact between manufacturers and consumers was never greater than it is today. It is imperative that the manufacturer know what is in the mind of the consumers, and supply the answers to the best of his knowledge. Yet it would be a great mistake for the manufacturer to rely on professional consumers—those who make a livelihood by creating issues of controversy (the more issues, the better the livelihood) —for advice on what the consumers really want.

The times call for intimate contact without the serial intercession of intermediaries whose livelihood will be gone as soon as understanding is reached. Reports by word of mouth have a way of becoming garbled. What *A* says that *B* claims that *C* does not want, or what *B* reports to *C* about *A*'s ability or inability to obtain from manufacturer *X* answers to the queries put to him permits too much variation between the ideas that manufacturer *X* must exchange with consumer *C* in order to reach an understanding.

The head of every food concern should accept a great many invitations to meet with consumer groups. This is a job for the head man, and is decidedly not a job to be delegated to a subordinate. People want to know the boss himself and hear his own extemporaneous answers to their questions.

Letter of the Law Vs. Reasonable Construction

ACTION recently begun in the Federal District Court against Swift & Co. raises the question as to whether it is always wise to place a strictly limited construction on the vaguer sections of business regulatory laws.

The action in question arose over the construction placed by the Wage and Hour Division of the Department of Labor upon Section 7(*c*) of the Fair Labor Standards Act. Under this section, exemption is provided from the maximum hours provision during a period or periods up to fourteen work weeks to those engaged in "handling, slaughtering or dressing poultry or livestock."

Government contends that this exemption applies only to those actually doing the handling, slaughtering or dressing, and does not apply to anyone concerned with anything after the meat goes into the cooler. Packers hold that, when peak runs of livestock occur, all departments of the packing plant must operate in order to handle the perishable product in an economical and satisfactory manner. Packers also hold that the exemption should apply to different groups of employees at different times, while the government holds that the exemption must be applied simultaneously to all exempted employees.

Apparently, the object of the Fair Labor Standards Act was to protect employees from unduly long working hours without commensurate pay, and to force the employment of additional workers rather than to have existing employees working overtime. But, in making the exemption for the fourteen-week period apply to those industries which handle perishable foods, the Act recognized that some exception to the law was needed for this special group, to enable them to operate in an orderly manner.

Having made this exemption, it is to be hoped that it will not be construed so narrowly that the benefit it promises to the processor of seasonal foods will be entirely withheld.

A Remarkable Investment

MANUFACTURERS would do well to consider the insurance value of small stand-by power plants, for in cases of emergency one of these may save enough to pay for itself in a few days. Such an emergency as the March 4 sleet storm that afflicted most of the Northeastern States usually puts all power lines out of commission for days, except those that are in underground conduits. On the other hand, an emergency like the floods of a few years ago usually short-circuits and ruins the underground power distribution systems for even longer periods.

A wide range of types and sizes is available in diesel, gas or gasoline-driven electric power units that can be used for stand-by service. Diesel units are made by one company, for example, in sizes from 15 kw. to 65 kw. at costs ranging from $1,700 for the small size to about $4,500 for the large size. Gasoline-driven power units are considerably lower in first cost, though higher in operating cost. Operating cost is not especially important in stand-by or emergency service. For instance, one make of gasoline-driven electric power unit in a 10 kw. size sells for around $1,400, complete. Another company sells a 57 kw. unit for less than $3,000.

In the recent sleet storm the direct, traceable losses caused by a four-day shutdown in one plant would just about have paid for one 57 kw. emergency plant. One can only guess at the losses due to lost patronage, good will and reputation for service that would have been credited to a stand-by plant under the March 4–8 conditions.

But emergency power plants, like insurance policies, must be purchased prior to the disasters they are expected to cover.

Whoever installs a stand-by power plant should be certain to locate it high and dry, well above any possible floods, and in a fireproof room. Never put it in a basement. It should be operated for a few hours every week to be sure that it is in perfect readiness at all times.

Properly installed and cared for, it will pay its cost in a week under emergency conditions. What better investment could be hoped for?

Dear Old Homo Sap

JUST to whom credit is due for the following observations, we do not know. They are so accurate that they are passed along so that you may share them.

What People Will Do

1. Follow a habit until it hurts.
2. Accept beliefs ready-made and stick to them till Niagara Falls.
3. Follow leaders blindly, eyes shut, mouths open, ears flapping.
4. Believe their friends even after they know them.
5. Yield to suggestions coated with flattery.
6. Work hard to establish superiority in the eyes of their fellows.
7. Glorify the past; discount the future; cuss the present; and remember very inaccurately.

What People Won't Do

1. Look far beyond their own self-interest.
2. Accept change willingly.
3. Fight for anything when they can find something to fight against.
4. Dare to be different from their crowd, except in those differences their crowd has set up as superior virtues.
5. Deviate from the line of least resistance, except when they're mad.
6. Act, even in important matters, unless promptly and repeatedly followed up.
7. Suspect low prices and embrace true economy.

Stopping Progress By Standards of Identity

A FEW MONTHS AGO we remarked editorially that we were confident that progress had not yet come to an end. This comment was prompted by the rigid standard of identity of evaporated milk for which the Food and Drug Administration was pressing vigorously. Such a rigid standard would preclude the commercial utilization of any further technical advances in the use of colloid stabilizers, because the food and its ingredients would be so defined that nothing else could be legally included without the long drawn out process of developing a new

definition and standard of identity. This would be so expensive and tedious a procedure that it would be unlikely that anyone would want to tackle it for years to come. And thus progress would come to a standstill.

The same problem has arisen subsequently with respect to canned tomatoes as a result of the researches of Dr. Z. I. Kertesz into the enzymes of the tomato. His work, carried out at the New York State Agricultural Experiment Station has shown how the addition of a very small amount of a soluable calcium salt to canned tomatoes before processing results in greatly improved quality of product. The mechanism of the improvement need not be discussed here.

The big problem is how is the industry to utilize this new technical advance? Because the standard of identity of canned tomatoes has been rigidly defined under the new Food, Drug and Cosmetic Act, it is not legal to call the improved product canned tomaties—no, not even if the label says that calcium chloride has been added to the extent of 150 parts per million.

While we realize that nothing that is said here can change the situation in any way with respect to tomatoes, we do hope that any new standards of identity for other foods will be drawn in such a way that technical progress is not prohibited. In effect, the present situation would be comparable to a grant of power to some bureau of the government to prevent the utilization of any new inventions by anyone shipping goods in interstate commerce. It is not sound public policy.

Continuous Processes For the Control of Multiple Variables

(For Food Technologists Only)

WHY HAS NOT SCIENCE caught up with the art in many branches of the food business?

A well-known food technologist has said that a laboratory is a very great help to butter making, but that if you want to make good commercial butter you must employ a good butter maker. But he may be a square head who is quite disdainful of the laboratory's help. The effects of his disdain may be apparent only after the butter has been in storage or in the hands of the trade for some time, and quite beyond the scope of a butter maker's comprehension.

It's always a problem for management to get the technician and the technologist to work in a team and really cooperate. (Which is something all young food technologists must learn and master as rapidly as possible.)

A fairly recent experience in a baking laboratory brings out another aspect of the question. Here they were testing out flours of widely differing characteristics, but despite the differences the test loaves made by an experienced practical baker in the laboratory were nearly alike. So much alike that the chemists were somewhat puzzled. Then they put a chemist on the test baking job. He was not a technician. He followed the rules or directions for conducting a baking test without any conscious or unconscious variations. Only then did the difference between the flours show up in the test loaves.

It seems that the experienced baker had unconsciously compensated many of the flour differences by suitable manipulations of the dough. For he had learned by long experience to produce fairly good bread from any kind of flour. The chemist, however, did not know all these manipulative tricks.

THE SAME KIND OF SKILL also goes into the making of cheese, butter, candy, wine, beer, malt and many others of the food-producing arts. You can't always learn the "how" in college though you can learn the "why." Which is the difference between a technician and a technologist.

Probably the first real light on the reasons why science has not caught up with the art is contained in a paper by M. C. Markley, *Cereal Chemistry* **14**, 834, 1937. He proposed to express the baking quality of a flour in a three-dimensional graph—a surface, instead of a linear curve. This would express the relationship between mixing time, fermenting time and bread quality for any lot of flour. (See FOOD INDUSTRIES **10**, 232, 1938). By using this method of evaluation, the laboratory is enabled to advise the practical baker on what to do with a new lot of flour. Otherwise the baker might struggle with trying this and that on full-scale production, based on his lifetime of experience, and ultimately hit on the correct procedure about the time the lot of flour was all used up.

ALL OF WHICH, plus observations in other fields, suggests an explanation as to why science has not caught up with the art. Up to now science has penetrated pretty much into those arts where the number of variables are few—not more than two. But when you get into materials having many different properties, all capable of varying simultaneously, it would require a graph having 4, 5, 6 or more dimensions to express those properties. But up to now nobody has yet evolved a method of such graphic expression. The best that can be done now is a three-dimensional graph.

Your artisan or technician, on the other hand, has gradually evolved a subconscious method of integrating all the variables in his own mind. He can integrate sight, smell, sound, feel, weight, size, stickiness, fluidity, etc. This permits him to reach a decision as to what to do, and generally it will be more nearly correct than the decision of a technologist who lacks the experience on which to base an integration despite a splendid education.

To those who are teaching food technology, or are considering research projects in this field, we would commend considerable study of this aspect of manufacturing problems. One of the reasons why continuous manufacturing processes are more easily controlled as to quality is intimately associated with the foregoing. In a continuous process it is often possible to control one, two or all the variables at will—a thing that is almost impossible in a batch operation. Such control in a continuous process is possible because each step occurs separately — or nearly separately — in sequence, in a well-designed piece of production equipment.

ON QUALITY CONTROL, preservation of quality, flavor, body, texture and the like, science is way ahead of the art. But technology is rapidly invading and leading the production field via the continuous process, e.g., continuous vinegar making, continuous salad dressing production, continuous ice cream freezing, continuous margarine production, and continuous jelly production.

Science will go far ahead of the art when these principles of control of multiple variables are mastered and made effective. And when that time comes the plant which can operate successfully in competition without a food technologist will be a rarity.

When You Sell to Uncle Sam

THOSE colored rectangles that we have published from time to time have a further value to you if the standards of quality to which they apply involve any food which you manufacture.

When the government sets up these A.M.S. standards, it is only a matter of time before they become incorporated in the Federal purchasing specifications which must be met when you sell foods to the government.

Sixteen Things That Can Go Wrong With AIR CONDITIONING

Troubles that may be encountered in food plant installations and how they are solved

By C. I. ELLIOTT
Carrier Corp.,
New York, N. Y.

Part I

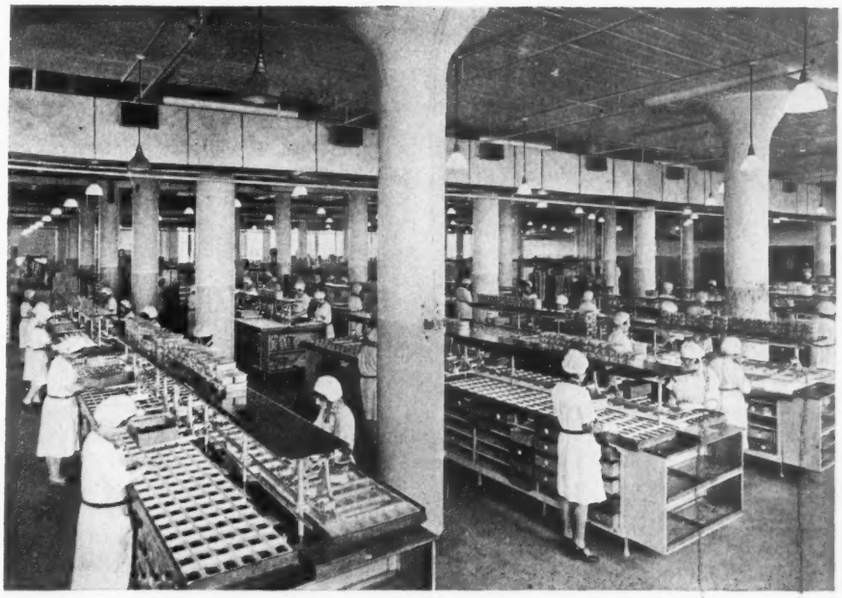
WITHOUT proper air conditioning, many industries would be under distinct technical handicaps compared to their current record of efficiency. Some industries would be unable to operate at all. Yet the mere acquisition of air conditioning equipment does not in itself guarantee adequate and satisfactory atmospheric conditions in a plant. The equipment must be installed correctly, operated correctly and maintained correctly. Furthermore, it must not be overloaded or expected to perform beyond the limits of its design.

Or to state it in another way, the user of air conditioning equipment has certain responsibilities of his own, responsibilities that extend beyond the control of the builder of the equipment. Sometimes it is the user's fault when perfect satisfaction is not attained. But if the principles involved are thoroughly understood in advance, the possibilities of dissatisfaction are greatly minimized.

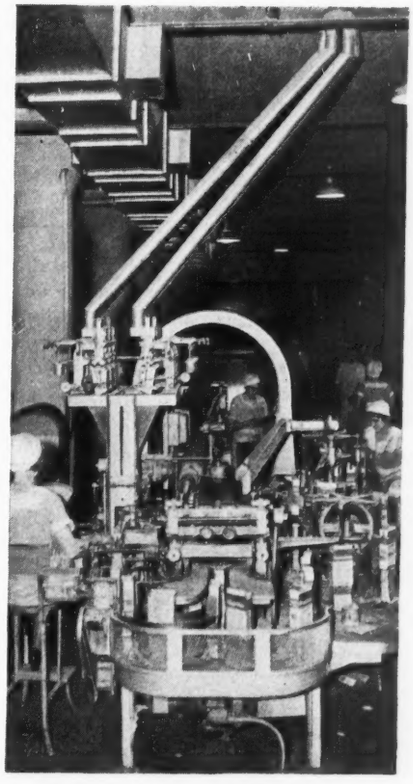
First of all it is important to understand that industrial air conditioning or process air conditioning involves attainment of certain specified conditions in the atmosphere. The American Society of Heating and Ventilating Engineers says:

"The term 'air conditioning' in its broadest sense implies control of any or all the physical or chemical qualities of the air. More particularly, it includes the simultaneous control of temperature, humidity, movement and purity of air. The term is broad enough to embrace whatever other additional factors may be found desirable for maintaining the atmosphere of used spaces at a condition best suited for the use these spaces are put to."

The physical properties previously referred to are: temperature, relative humidity, air motion and the removal of solid particles in the air, such as bacteria or dust. Independent control of these factors makes it possible to produce room conditions to suit a definite requirement. Thus, an area may be maintained warm or cold, dry or humid, with clean or dusty air, quiet or turbulent as regards air motion, or at any intermediate point between these extremes.



Large overhead ducts with numerous outlets distribute conditioned air in the candy plant of W. F. Schrafft & Sons Corp., Boston.



Conditioned air is supplied to the packaging department of the Post Products division of General Foods Corp., at Battle Creek, Mich.

Temperature is measured with a dry bulb thermometer.

Relative humidity is determined by comparing the dry and wet bulb temperatures of the air; it is a measure of the amount of moisture in the air relative to complete saturation.

Air motion means the rate of movement of air about the room or space which is being air conditioned. Air motion represents the combined effect of direct and indirect (induced) air circulation.

Cleaning and filtering the air assures against the presence of spores, bacteria, dusts or other contamination in the conditioned area.

The best of equipment must be properly designed, maintained and operated and must be properly installed—even air conditioning equipment. A few case histories of problems relating to the foregoing will

serve to illustrate this statement and may assist others to diagnose their own problems.

1. Stratification

There is a problem of stratification of air in large ducts or in small, low velocity ducts. The fact that air has a tendency to stratify due to differences in temperature requires special consideration in equipment design and installation. In one case, considerable difficulty was experienced in obtaining uniform conditions in the areas to be conditioned. Tests proved that the air discharged from one side of the duct was considerably warmer than that discharged from the opposite side. Further investigation showed that a definite stratification was taking place in the discharge duct. A temperature difference of 15 deg. F. was measured between the top and bottom of the duct. Going farther back, it was found that the same stratification was taking place in the air supply duct to the fan. (One would think that the air passing through the fan would be mixed to a uniform temperature, but this was not the case.)

The difficulty was found to be an outside air inlet on the intake side of the fan admitting cold air to the duct. To remedy this condition a baffle was installed in the supply air duct, between the fan and the outside air inlet, of such size as to cause considerable turbulence of the air for proper blending and thus to overcome the uneven temperature. It also provided closer regulation of the system, due to a uniform air temperature at all duct outlets. (See Fig. 1.)

2. Another Case of Stratification

Another case of uneven temperature, due to stratification, was one where the reheater coil was of the series type, controlled by a modulating valve. When the steam valve was partially opened, it would heat one side of the reheater coil. The air passing through the coil was not uniformly heated, and the air passing over the hot portion of the coil became excessively heated and did not mix with the cool air. It stratified. The main duct continued to a tee. The branch passing to the side where the hot air was located received all the hot air. The opposite branch received none. This caused almost complete loss of control. One end of building was excessively hot while the other end was too cool. (See Fig. 2.)

The remedy here was easy, it only being necessary to install a baffle plate between the tee and heater coil. This caused considerable turbulence and in this manner mixed the air, making it of uniform temperature. No loss of volume or appreciable increase of static pressure was noticed after making this change.

3. Problem of Proper Zoning

Air conditioning in a warehouse is a problem of proper zoning. This is done to offset the effect of wind and sun, which changes from side to side or end to end throughout each day. As a result, the amount of heat to be removed changes. (See Fig. 3.)

Attempting to use a single unit of cooling and reheating, with a single control point in the room, will not give satisfactory conditions, except at the point of control. One end of the room will be too high in temperature, the opposite end, too low. The best system here is a central unit operating at somewhat lower temperature with zone controls at each end with a separate reheater. For humidity regulation where different dew points are required in different areas, the addition of humidifiers is also necessary. Another reason for zoning in large areas is that products may not be uniform and proper zoning will compensate for the variations in heating load resulting from these variations or differences.

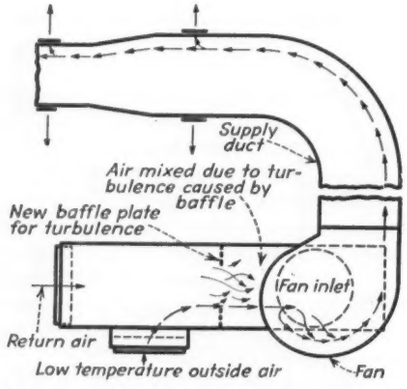


Fig. 1—Use of baffle plate in fan inlet duct to set up turbulence that mixes the air and avoids stratification due to a temperature difference.

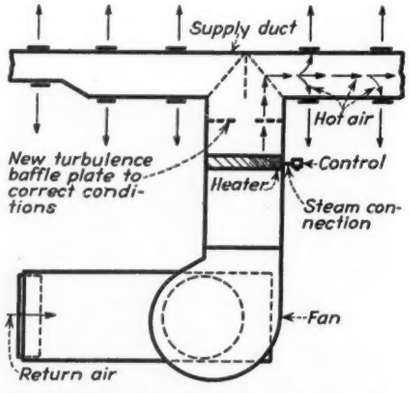


Fig. 2—Use of baffle plate between heater and supply duct to mix air by turbulence and prevent stratification. This is necessary because one side of the heater is hotter than the other.

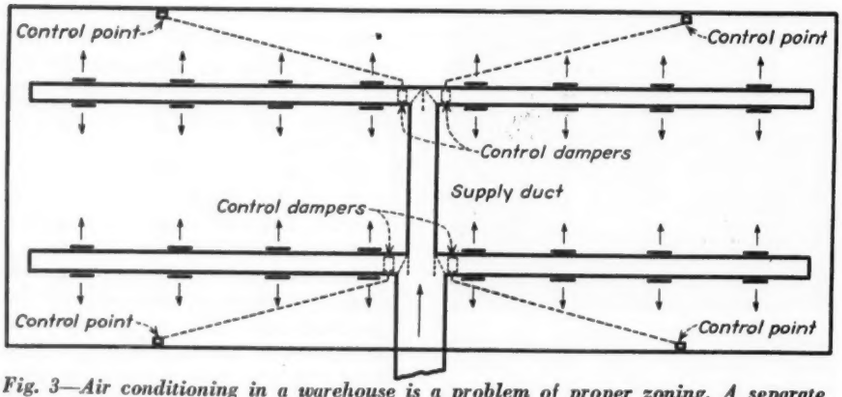


Fig. 3—Air conditioning in a warehouse is a problem of proper zoning. A separate control point and a separate heater for each zone solve the problem.

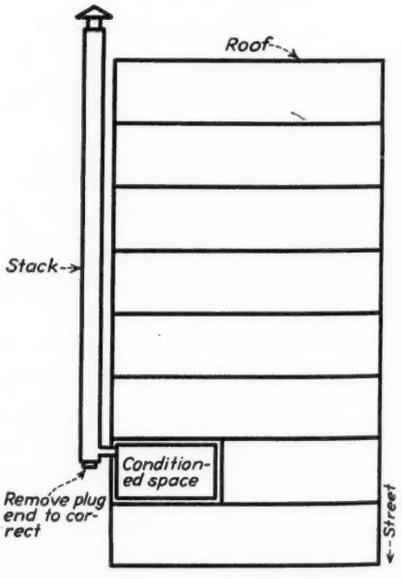
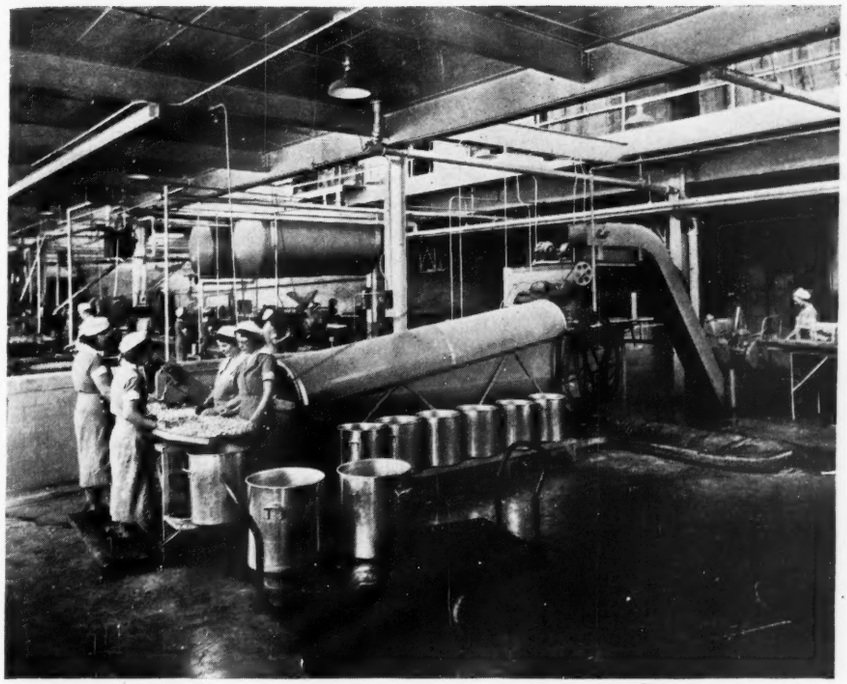


Fig. 4—The stack effect of a vent pipe caused excessive infiltration of air into a conditioned space and upset the conditions in the room. The trouble was remedied simply by removing the plug from the bottom of the vent pipe.



Air conditioning is used to improve quality in the modern plant of La Choy Food Products, Inc., Detroit. This picture shows celery being washed. The celery is kept crisp until used by conditioned air.

4. Shrinkage

In most hygroscopic materials, a controlled amount of shrinkage is required, ranging from zero to as high as 90 per cent if drying is done. Other materials may require moisture addition, ranging from zero to 50 per cent.

Shrinkage is controlled by two factors only:

a. The relative velocity of the conditioned air moving over the product.

b. The difference in vapor pressure between the center of the product and the air surrounding the product.

The nature of the product itself, such as its "sealing-off" value, has some bearing on the moisture removed or gained. In a great many products, such as meat and gelatine, a gelatinous material collects on the surface, thus forming a seal which reduces the moisture removed from the product by the air.

5. Effect of Surrounding Conditions

In a recent case, a large company was processing a material which would dry out readily and seal itself quickly, its value being considerably reduced thereby. No amount of air conditioning was of value after the seal was formed. Restoring this product to its original value was impossible. The conditions of air required to assure a high grade product were 54 deg. F. and 96 per cent relative humidity. Under uncontrolled conditions it was found that the slightest outside influence would upset the room conditions and that temperatures and relative humidities varied from 54 deg. F. and 96 per cent to 58 deg. F. and 75 per cent.

The room was equipped with windows made of triple glass sash. When the sun reached these windows, radiant heat raised the dry bulb temperature in the room, thereby lowering the relative humidity. Further investigation revealed a steam line without insulation passing through room. This introduced another uncontrolled heating variable. The worst effect was the practice of adding heat to the room to dry a wet floor.

The correction of these faults brought the room to uniform temperature and humidity. Quite obviously, the closer the need for control of temperature and humidity, the greater is the disastrous effect of such adverse uncontrolled influences.

6. Stack Effect of Vent Pipes

In one large, high temperature, industrial air conditioning installation, the relative humidity was not constant and was very much below normal. The puzzling feature was that the air conditioning system had produced proper conditions for several months. Then, suddenly, it failed. This room was on the ground floor of a seven story building. A vent from the room passed through the side wall of the building and was used to discharge vapors at times. The owner of the building, not liking the vapor discharge located at ground level, ran a 40-in. vent pipe to 10 ft. above the roof of the building, making the discharge at the top of the building. The stack effect of the new vent, with vapor at 160 deg. F., was so great that a vacuum was created in the room, thus causing excessive infiltration into the room and upsetting room conditions. The remedy here was easy. The plug in the bottom of the vent pipe was removed, the vapor again discharged as originally intended, and the stack effect was eliminated. Correct air conditions were the result. (See Fig. 4.)

7. Fan Revolved in Wrong Direction

The most simple and common complaint involves fans. And of the many complaints of this type, the most serious is the reverse operation of fans. A food manufacturer told me of one job that actually operated for two years without ever quite coming up to guaranteed capacity. Service man after service man had called, and had made change after change in the duct work, outlets and adjustment of the controls. They speeded the fan up, slowed it down and made an endless procession of such maneuvers until the patience of the purchaser, as well as of the seller, was exhausted.

Finally, after sheer exhaustion, a young engineer was sent to the job. He was very unfavorably received by the customer. The customer believed that nothing less than the chief engineer should be entrusted with the solution, since others had failed. However, he allowed the young engineer to "waste" his time at the vendor's expense. After donning his overalls, the young engineer went into the plant and returned in a surprisingly short time with the answer. The arrow showing the direction of fan rotation had been placed on the fan housing in the wrong direction. Reversal of a few wires quickly remedied this job.

8. Friction Losses in Ducts

Another difficulty is the failure to accurately estimate the duct loss and failure to provide enough speed or power to the fan. Or worse, to supply a fan so close to the estimated requirements as not to allow for some shortcomings. A good rule is never use a direct connected fan in installations that require some field adjustment. Allow some leeway for changes—and for shortcomings in engineering.

Part II of this article, giving eight more air conditioning problems and their solutions, will be published in May.—THE EDITORS.

Clearing Up the Confusion About SUGAR SIRUPS

By LEONARD WICKENDEN
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New York, N. Y.

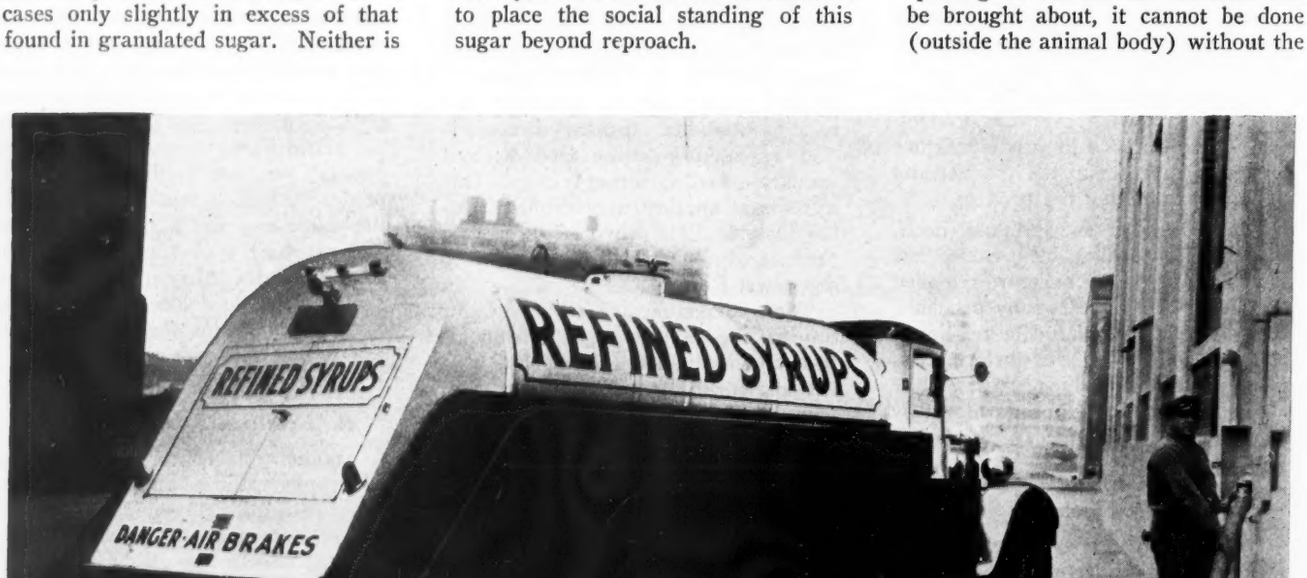
MUCH confusion exists regarding the sugar sirups used in industry. There is a widespread belief that all such sirups are either wholly or partially inverted, and while the word "invert" is not always fully understood, there has arisen in some quarters a tendency to look askance at invert sirups as though their social standing was not all it should be. Stories have arisen to the effect that sugar sirups are "partially refined" and even that they are made from molasses.

Let us start by clearing the ground of some of the things that are not so. It is not true that all industrial sirups are inverted. Large volumes of sucrose sirups are manufactured and shipped, and these sirups contain only minute quantities of invert, in some cases only slightly in excess of that found in granulated sugar. Neither is it true that invert sirups are low grade substitutes for granulated sugar. As pointed out by R. S. McBride in the November, 1939, issue of FOOD INDUSTRIES, the molecule of sucrose (the sugar with which everyone is familiar in the form of granulated, cube, powdered and so forth) can quite easily be split in two. This split brings about the formation of an equal weight of two simpler sugars, the blend of which is known as "invert sugar."

The same article also tells us that all sucrose taken into the body must be converted to invert before the animal organism can make use of it. In other words, there is no man, woman or child in the world who is not a miniature walking invert sugar factory, which fact should be sufficient to place the social standing of this sugar beyond reproach.

This discussion of
RAW MATERIALS
Is of interest to
All Food Manufacturers
Because it deals with the properties of sweetening agents used as ingredients in processed foods. Some confusion exists in regard to the characteristics of sugar sirups.—The Editors.

In spite of the ease with which the splitting of the sucrose molecule can be brought about, it cannot be done (outside the animal body) without the



Delivering sugar sirup to a food plant. Transported in closed tanks and delivered to the process through hose and pipe lines, the sirup is protected from contamination by dirt.

expenditure of money. It is clear, therefore, that no manufacturer would go to the expense of making invert sirup unless there were some reason which made it worthwhile for him to do so. There are two reasons. The first is that a mixture of sucrose and invert sugar is more soluble than sucrose alone, so that it is possible to make a stronger sirup of the mixed sugars, thereby reducing the amount of water which has to be shipped and stored. The second reason is that, because of its special characteristics, there is a definite consumer demand for invert sugar. In the first place, it is slightly sweeter than sucrose; in the second place, it has the property of absorbing moisture, so that it assists in keeping cakes and similar goods soft and moist; and in the third place, it is more soluble than sucrose, so that products made with it are less likely to crystallize. To meet the varied demands of different manufacturers, the sirup refiner customarily offers a variety of sirups ranging all the way from practically 100 per cent sucrose to practically 100 per cent invert.

The claim that industrial sirups are "partially refined" is as misleading as the belief that all industrial sirups are partly inverted. In the first place, many sirups on the market are actually manufactured from granulated sugar. In other instances, sirups are made from identically the same raw material as is used in the manufacture of sugar, and in such cases the raw sugar is put through a refining process similar to that used in the manufacture of granulated sugar but in some respects more drastic. In the manufacture of sugar, the raw melt is filtered through either bonechar or activated vegetable carbon. In the manufacture of sirups, the melt is given either a filtration through both bonechar and vegetable carbon or a double filtration through the latter. In the case of sugar, the purified melt is concentrated until it crystallizes. In the case of sirup, the concentration is stopped just short of crystallization. Since both granulated sugar and industrial sugar sirups fall slightly short of being 100 per cent sucrose, both of them, in the strictly chemical sense, are partially refined. In the broader sense, however, both of them are exceptionally pure and highly refined products.

MOST of the impurities which exist in granulated sugar as it enters into manufacturing processes gain access to the sugar after it is made. Sugar in dry form is usually shipped and stored in bags, and it is common observation that dirt of one kind and another can and does sift through a sugar bag. Sirup, however, is shipped and stored in a system of closed tanks and pipe lines, and no dirt can sift through a pipe line. For this reason there are frequently good grounds for claiming that sugar entering a jam kettle or an ice cream mix in the form of sirup is a purer product than granulated sugar dumped from a bag.

Sugar sirups are manufactured in this factory at Yonkers, N. Y., located on the banks of the Hudson.

NO industrial sugar sirup used in place of granulated sugar could be made from molasses. Those connected with the sugar industry are accustomed to visits from mysterious gentlemen who tell wonderful stories of converting blackstrap to "whitestrap." There is, however, no commercial process by which any such transformation can be brought about, and there is no likelihood of one being developed in the near future. Even with the highest grades of refinery molasses, the best that can be done is to convert them to so-called golden sirups, and even these are none too securely on the "gold standard." This is not to say that these golden sirups are undesirable products. On the contrary, they are completely wholesome, and many of them are pleasing in flavor. They have their uses, but they cannot be used where a sirup approaching the color and purity of ordinary granulated sugar is needed by the manufacturer to obtain the desired quality in his products.

The process of boiling a sugar sirup until it crystallizes results in the removal of some of the ash from the sugar. When crystallization occurs, more of the ash remains in the sirup or mother liquor and less of it goes into the crystalline sugar. Considerable publicity has been given to this fact, and if people have been puzzled regarding the nature of invert sugar, they have become completely confused on this question of ash. This is strange because ash is something which the average person sees daily. In short, ash is the residue left by organic matter when it burns; it will not burn because it is mineral matter or salts. The body of a man of average weight contains about 7 lb. of ash, and we need ash in our foods to keep in health. Some extremists in the dietetic field claim that disastrous results follow the consumption of white bread because it contains less ash than whole wheat bread, and a similar argument has even been used in favor of raw sugar as compared with refined sugar. Since, however, almost everything we eat contains some ash, it is not normally necessary to eat either whole wheat bread or raw sugar to fill the mineral requirements of the body. At the same time, there is no reason why one should not eat either of these products as a matter of personal taste.

At the recent hearing in Washington for fixing standards for preserves, jams and jellies, there was general agreement among the experts that ash is definitely harmless and probably beneficial. In any case, the percentage of ash in sugar sirup is a small fraction of 1 per cent and is only slightly higher than the ash in granulated sugar. While there may be manufacturing processes in which even this slight increase in ash content is undesirable, such processes are rare and are probably outnumbered by those in which a higher percentage of ash is actually desirable.

Wartime Control

Troubles British Food Manufacturers

By
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London, England

IT is certainly a novel situation in which the British food manufacturer now finds himself. Official control has quietly, efficiently and firmly taken hold of him. He is told what he can have, how much of it, and where he shall get it, and the prices he must pay and receive. In some ways this makes life much simpler; in others it dulls the glamour of enterprise and brings annoying complications.

The Ministry of Food is the only buyer of raw sugar, which it sells to the refineries for distribution through wholesalers to manufacturers and retailers at fixed prices. The Ministry is the sole purchaser, and slaughterer, of livestock and also of imported meat (all frozen now). Other essential commodities such as wheat, cocoa, and oils and fats likewise come under full government control. The flour miller, meat packer, manufacturing confectioner, and so on, are given their definite quotas of raw materials; they pay fixed prices and sell at fixed prices for most products.

From one angle this should make for efficiency, once the ministerial and industrial machines have had time to get nicely cogged into one another. But the point is that the whole intricate structure must at the same time have the qualities of flexibility and resilience to enable it to adapt itself quickly to any sudden emergency that might arise. Time is, however, required for official departments to gain experience and for industry to reorientate itself to the new conditions.

The government very wisely makes use of the services willingly offered by industrial leaders, although not to the extent that many people would like to see. Advice is taken from individuals and specialist committees, and policies are thrashed out by cooperation of representatives of both sides—official and industrial. By this means, every effort is made to preserve so far as possible the existing structure of industry and to cause the minimum of interference with its normal ways of functioning.

It can be well imagined that the parceling out of any particular raw material or other commodity is not an easy matter. Many demands, civilian and military as well as industrial, have to be met. The principle adopted may be illustrated as being somewhat as follows: When it appears likely that supplies are going to be short, the raw material priority department of the Ministry of Supply informs the central priority department. A subcommittee is called and all departments concerned submit their requirements. The appropriate controller also submits a return to the stock position, and the committee explores ways of improving

British Combine Photos, Ltd.

All raw sugar for Britain is bought by the government, which sells to the refineries for distribution to wholesalers and thence to manufacturers and retailers. All purchases of refined sugar are allocated and controlled by the government, and the individual is allowed 12 oz. per week.

British Combine Photos, Ltd.

Britain now imports frozen meat instead of chilled meat, and all meat imports are controlled by the government through a body representing all the meat importers of the country, known as "Mindal" (Meat Importers National Defense Association, Ltd.). This method takes advantage of specialized experience and preserves the meat importation set-up intact for the return of peace.

British Combine Photos, Ltd.

British food control strikes home to the public in scenes like this, showing housewives presenting coupons before making bacon purchases. This control begins with the raw material and extends through every step of manufacture and distribution.

these supplies. When the extent of the available supplies has been gaged, the next step is to consider the requirements of the various departments in detail. After that, if there is a deficiency, somebody has got to go short and the committee has to decide who it shall be.

Sugar Products Industries

The all-absorbing topic of the moment is the swift and unexpected action taken by the government in rationing, from February 1, all sugar required for manufacturing purposes. The total requirements for such purposes ordinarily amount to a little less than half the sugar consumption of the country. Now, a certain percentage of the amount normally used has been allocated to each group of commodities, ranging from 75 per cent in the case of condensed milk to a mere 25 per cent for candied peels, as shown in the following list:

Product	Per Cent
Condensed milk	75
Syrup and treacle	70
Jam	70
Chocolate	70
Certain beverages	65
Sugar confectionery	60
Cakes and biscuits	60
Bottling and canning	50
Ice cream, jellies, coffee, essences, custard powders	50
Mineral waters	25*
Candied peel	25

*Subsequently increased.

The main purpose of imposing these restrictions on sugar consumption is, of course, to release shipping space and conserve foreign exchange for vital war commodities. As for the considerations determining the allocations, these have evidently been based on the importance of the different products in household use and in food-value. It would appear that the question has been approached from the consumer's angle, at least from the dietitian's angle, as to what is best in the interests of the consumer.

Other factors have necessarily been taken into consideration, such as the possibility of reducing the sugar content, despite some sacrifice in taste, and of replacing sugar by alternative substances such as glucose, dextrose and saccharine, although the former are at the moment no easier to obtain than sugar; as for saccharine, even if there is no difficulty in getting it, its use demands considerable discretion.

Jam—In cases where sugar functions as a preserving agent, notably in jams, a limit is set to the reduction in sugar content which it is possible to effect. The sugar content cannot be reduced below 68 per cent without endangering the keeping qualities of the jam; in fact, a product with a 68 per cent sugar content will keep for a matter of two or three months only. Thus it appears that in these instances there is no alternative to a reduction in output.

Another difficulty arises in connection with long term contracts for the purchase of fruit. Most jam makers use imported pulp, mostly from Holland, but a few of the largest firms depend entirely on home-grown fresh fruit. In the case of soft fruits, purchase is usually done on inspection by the firm's representative when the crop is ready for picking. Boiling, or pulping, is begun within a few hours of picking. As it is considered preferable to buy sufficient stocks of fruit to last the whole jam making season (thereby facilitating control of pH, pectin content, hardness of fruit, etc.), jam manufacturers are bound to have an anxious time readjusting whatever arrangements they may have made with fruit growers and in trying to estimate their chances of securing an increase in their sugar allocaiton by the time the jam-making season starts, and, incidentally, in coming to a decision as to whether it will be possible to continue in business on a reduced output in the event of their being unable to obtain army contracts or supplementary manufactures.

Candy—A 60 per cent sugar allowance for the manufacture of confectionery is very sad news for an industry which occupies an important position in the country, and was received with a lively display of protests. The general opinion seems to be that production will be slowed down and many people thrown out of work. One estimate is that production will drop by one-third and that 60,000 workers will lose their jobs. On the other hand, there is the view that the industry will find ways and means of keeping up the output with the help of its chemists, who are in a better position to tackle the question of sugar substitutes without disastrous effects on quality than they were 20 years ago.

The belief that manufacture will tend to become limited to best sellers and easy production is probably not far wrong. Some of the flavor manufacturers think the tendency will be for the better quality lines to survive and are making their plans accordingly.

Chocolate—Many are asking why chocolate should have a 10 per cent higher sugar quota than candy. It may be that the government takes the view that chocolate has the advantage on nutritional grounds. There is, however, another consideration which might carry a great deal of weight in certain circumstances. Like the manufacturers, the government, in its capacity as a purchaser and distributor of raw materials, is constantly faced with the problem of balancing deficiencies and surpluses. As an instance, one may take the hypothetical yet possible case of an accumulation of cocoa overseas which would only become available for consumption if and when an adequate amount of sugar was forthcoming. As a matter of fact, the government is buying up the whole of the West Africa cocoa crop.

Flavors—One interesting effect of sugar rationing is to bring home to confectionery manufacturers the value of the technical resources of the flavoring industry. There are indications that they are hoping for considerable assistance from this source. Anticipating these requirements, the techni-

cal staffs of the leading flavor manufacturers are already at work exploring the possibilities of the new situation that has arisen. There is, for instance, the question of compounding flavors to enhance sweetness and also flavors which will cover up the presence of saccharine. Some authorities on confectionery flavors think that sugar rationing will tend to an increased demand for first class flavors owing to increased production of the better quality confectionery carrying greater margins of profit. Flavor manufacturers are also giving attention to concentrated flavors which minimize shipping space, as they are hoping to offset any falling off in the home trade by an improvement in the export trade. There is also a field for the matching of specialty flavors formerly coming from Germany.

Ice Cream—The ice cream industry is having to cope with restrictions imposed on two of its ingredients—sugar and butter. For many manufacturers there appears no alternative but to go on half production. If the 1940 season happens to be as tropical as this winter is arctic, then the ice cream man's cup will be filled to overflowing. Interest, of course, turns in the direction of substitutes. Butter offers no particular difficulty, as good vegetable fats are available. In the case of sugar, which has been cut down to half the quantity used last year, experts are already busy making suggestions. There is, for instance, the use of sweetened condensed milk (assuming it is available in sufficient quantity) as a good source of serum solids, as well as a means of easing the sugar situation. Twenty pounds in a 100 lb. batch would provide 5¼ to 5½ lb. of serum solids and 8½ to 9 lb. of the 13 to 14 lb. of sugar required. The balance of the serum could be supplied by skim-milk powder alone or with milk. Another interesting suggestion is to make half the batch of mix in the ordinary way and then to make it up to the full amount with the addition of mix made from an ice cream powder.

Milk Distribution Troubles

The other day a farmer was fined for showing unscreened lights in a cowshed. Denying there was any negligence, he protested that if he blacked-out his shed, he would be contravening the Dairies Act, which would also mean a fine. He was told that the Lighting Restriction Act took precedence and that he must find a way of screening the lights without breaking the Dairies Act—so he parted with his money and went away to puzzle his brains over a nice little problem in illumination.

The lighting restrictions — the "black-out"—have presented many a similar problem to others in the food business, whether on the manufacturing or distributive side, to say nothing of expense, inconvenience and loss of trade. Transport in particular has had a bad time these last few months with both lighting and gasoline restrictions and a spell of very cold weather. Rationing of gasoline has induced some firms to fit their vehicles with gas producers. Other firms have gone back to the horse and cart. There is a tendency to cut transport down to a minimum. Most dairies, for example, are making only one delivery of milk a day instead of morning and evening deliveries as before the war. In many cases the number of drivers has been reduced. This, of course, has not tended to make the milkman's life any happier. He now finds that nearly all his customers want their milk delivered in the morning and also that it is not easy nowadays to collect his money; the percentage of bad debts has increased. If he goes round on Sunday morning, people are in bed and they don't seem to see the point of getting up to pay the milkman!

There are two distinct sides to the milk business; production is one and distribution the other. The producers, *i.e.*, the dairy farmers, are fortunate in being organized into a powerful body known as the Milk Marketing Board, which for the past seven years has conducted the business of the producers—milk marketing, policy framing, price fixing, publicity, etc.—and the general opinion is that in the interests of both producer and consumer it has done its job well. It is still a separate legal entity; unlike marketing boards for bacon and potatoes, it has not been absorbed into the Ministry of Food.

At the beginning of the year the board found itself in an awkward dilemma—how to maintain the producers' margin of profit in the face of increased costs of production (mainly due to feedstuffs) without altering the retail price of milk to the consumer. The way out was found by inducing the Ministry of Food to come to the rescue with a subsidy, which enables the Board to pay producers 3d. per gallon in January and February, and 2½d. in March, above their returns for the corresponding months of last year.

The producer is satisfied—for the time being—but the distributor is not. His costs too have risen, but he has not been included in the subsidy scheme. It may end by the Ministry of Food taking over the control of the entire milk industry.

Meat Products Control

At midnight on January 14, the normal meat trade of the country came to an end. At midnight of the next day the Minister of Food took over complete control and became not only the sole purchaser of livestock for human consumption but the sole slaughterer as well. Added to this, he is the sole importer of meat and as such makes bulk contracts with overseas suppliers.

All livestock to be sold for killing purposes has to be sent to properly authorized "collecting centers" where the animals are purchased by the government buyer after examination by the "certifying authority," consisting of three persons acting under the authority of the Ministry. They determine whether the animals are fit for slaughtering, they classify and grade them, and they fix the prices.

In the case of pigs, the producer has two alternatives. He may send them to a collecting center, after giving about two weeks' notice to the District Chairman of Auctioneers; or he may send them direct to bacon factories by arrangement with the local Area Pig Allocation Officer, who acts under instructions of the Director of Bacon Production.

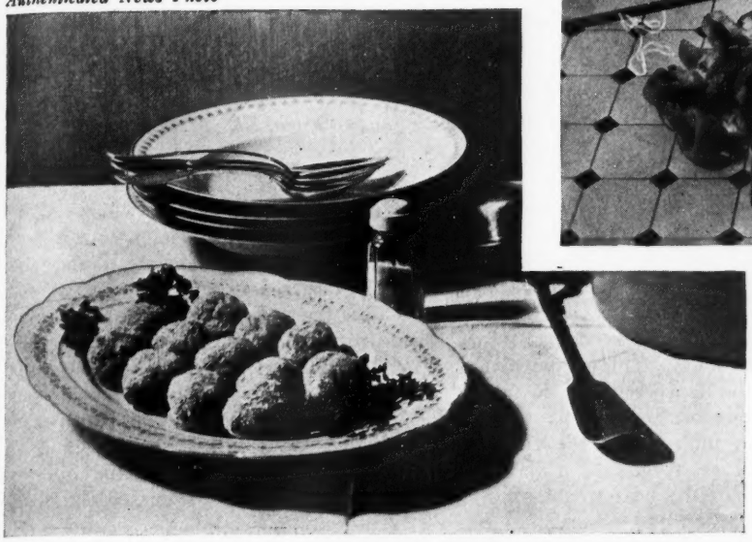
The supply of meat to manufacturers of meat products has also been brought under the control of the Ministry of Food. The manufacturer has to take whatever the Meat Controller supplies to him; there is no picking and choosing.

Bacon curing is very strictly regulated. In the first place, no one can carry on this business unless he and his factory have been properly licensed by the Ministry of Food. In other words, curing is confined to "licensed premises" operated by "license holders." Moreover, a curer can only produce bacon from pigs, carcasses or parts thereof sold to him for that purpose by the Ministry and marked by the Ministry's representative with the license number (or other suitable marking) assigned to the holder. The curer is only allowed to cure the meat in certain prescribed cuts and styles, and he has to keep a record of all the bacon which he puts into cure.

The fat melters of the country are also under control, and the Ministry of Food decides the amount of fat which each shall receive. Each of the eight meat areas into which the country has been divided has a Fat Melters' Advisory Committee. These bodies are responsible for the collection of raw fats from the slaughter houses and for the distribution to the fat melters of their particular areas.

Fresh or smoked pigskin (which may have been used to flavor yesterday's lentil soup) is chopped fine. Grated onions and grated hard rolls are added, and the material is formed into balls and boiled in salted water or bouillon cube soup. This yields tasty meat balls, the Nazi food authorities state. The pigskin meat balls are shown on a platter in the picture below. Maybe this is a potential market for used American footballs.

Authenticated News Photo



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Formulas by der Fuehrer

BORN of the war and nursed by the British blockade, food scarcity has prompted the Nazis to concoct some unusual substitute foods. The recipes are ingenious, if not appetizing. Some of them are pictured on this page.

Authenticated News Photo

"First class" hamburger is made from cows' udder by chopping it fine and mixing with salt, pepper, grated onion and two water-softened rolls. While this seems "udderly awful", maybe the Nazis like it.

Authenticated News Photo

Pumpkin bread is another Nazi substitute food. Here's the formula: Two pounds of pumpkin is cut, boiled in a little water until soft and put through a strainer. Two pounds of flour is put along the sides of a deep dish. The pumpkin is put into the center. Some yeast and a bit of salt are added. The ingredients are mixed to a heavy dough, formed into "breads" and left to rise for an hour. Then an hour's baking gives a substitute for white bread.

"Short Time" Pasteurization of Milk

As It Looks to the Health Officer

Correct choice and installation of equipment necessary to assure adequate pasteurization at all times

By FLOYD M. KELLER

Associated Milk Dealers Inc., Chicago, Ill.

SHORT-TIME, high-temperature pasteurization of milk is satisfactory providing proper construction and operation details are observed.

The two requirements of particular importance are: first, the establishing of a suitable combination of heat-treating temperatures and holding-time periods which will kill any pathogenic organisms present; and second, the use of equipment which will assure proper heating and holding of every portion.

Heating to a temperature of 160 deg. F. and holding for a period of fifteen seconds are the minimum temperature and time limits accepted by the U. S. Public Health Service Milk Ordinance and Code. These requirements are supported by results of experimental work done by the National Institute for Research in Dairying at the University of Reading on the destruction of tubercle bacilli and hemolytic streptococci as reported by A. T. R. Mattick; also by reports of the U. S. Public Health Service, whose work was done in conjunction with the New York City and the New York State Departments of Health. Both show conclusively that pathogenic bacteria in milk do not survive a heat treatment of 160 deg. F. for fifteen seconds. W. A. Hoy and F. K. Neave of the University of Reading report pathogenic organisms to be destroyed in milk before the enzyme phosphatase, regardless of time and temperature of the heat treatment.

My experience and observation on numerous experiments in which the temperature and time of heating and holding milk were varied show that, at all times, 160 deg. F. or higher for fifteen seconds or longer, the phosphatase tests were satisfactory, as compared to holding at 143 deg. F. for 30 minutes. Where holding at 144 deg. F. for 30 minutes is required, 161 deg. F. for sixteen seconds will give similar results. In that respect "short time" pasteurization meets the first of the two requirements for public health safety.

At the present time, the common construction for short-time, high-temperature equipment is the plate type heater with milk-to-milk regenerators, Fig. 1. Some installations also include plate-type coolers. The holders generally used are of sanitary milk pipe, sometimes referred to as "tubular holders." There is also a unit on the market which uses a cabinet heater and cooler with milk-to-water-to-milk regeneration and an open gravity flow holder.

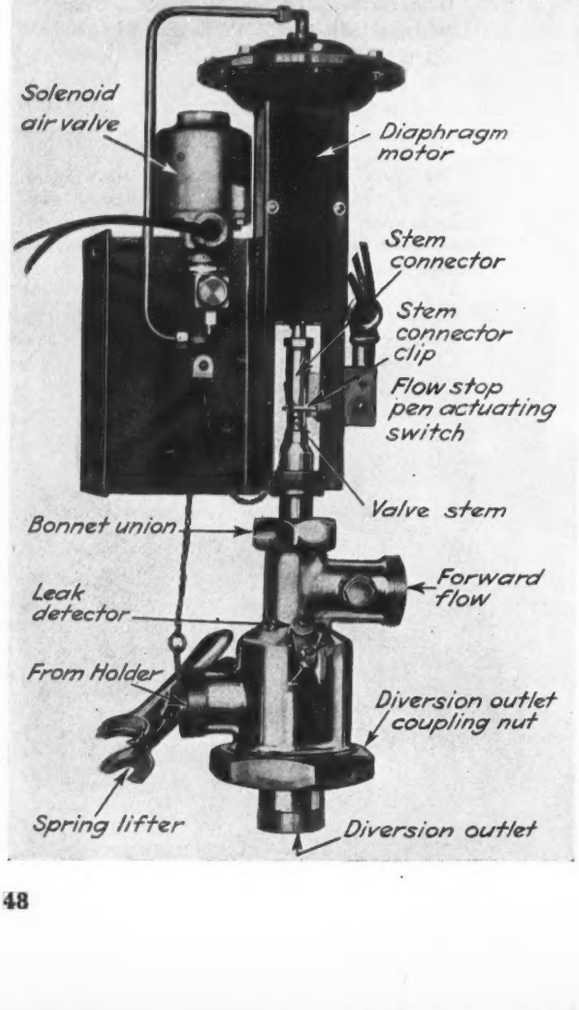

Fig. 2—By using a flow-diverting valve at holder outlet, forward flow of incompletely pasteurized milk is prevented.

The most important consideration confronting a health officer in the use of high-temperature, short-time equipment is that such equipment must be properly constructed and properly operated at all times. In my experience, if the construction and operation requirements discussed in this article are observed, the health officer can be assured that milk pasteurized by the "short-time" method will be as assuredly safe as by any other time and temperature method.

Short-time high-temperature units will meet the construction and repair requirements for milk handling equipment when all surfaces with which milk comes in contact are:

(a) Smooth and of corrosion-resisting metal or of unbroken vitreous material;

(b) Easily accessible for cleaning and inspection;

(c) Self-draining;

(d) In good repair and free from cracks and corroded spots;

(e) Tight fitting with no threads exposed to milk;

(f) Equipped with pressure-tight seats on submerged thermometer openings.

Metal seals on the pumps are recommended.

The temperature control devices should consist of a dependable automatic thermostat with a milk flow diversion mechanism installed at the holder outlet (*G* in Fig. 1, detailed in Fig. 2). A pump stop trip switch can be used, but none are in use at the present time. The purpose of the thermostatic control is to assure maintenance of a uniform pasteurization temperature. The diversion device or

Revision of paper read before Chicago Dairy Technology Society when author was a member of the City Dairy Inspection Section, Chicago Board of Health.

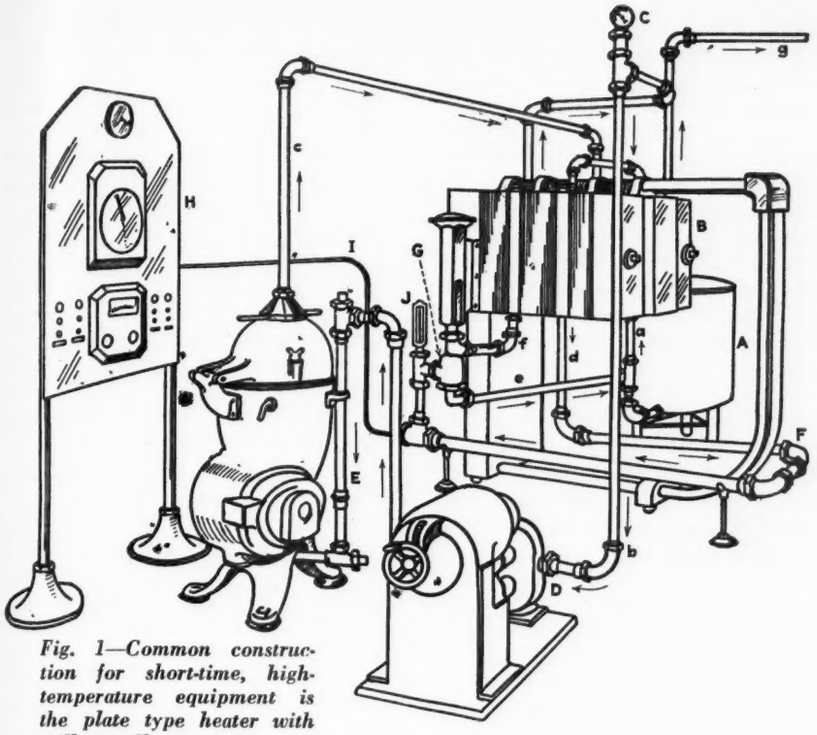

Fig. 1—Common construction for short-time, high-temperature equipment is the plate type heater with milk-to-milk regenerator.

Legend for Fig. 1

A—Float tank, the over-flow of which is below the level of any raw milk passage into the regenerator.
B—Plate heater, regenerator, and cooler.
C—Vacuum gage.
D—Positive milk pump.
E—Clarifier or filter.
F—Holder tube sloping continuously upward from inlet to outlet at the diverting valve (G).
G—Flow diversion valve.
H—Control panel.
I—Recorder and diverting valve controller bulb connection, the bulb of which is located close to the indicating thermometer, (J), in the holder outlet immediately upstream from the diverting valve, (G).
J—Indicating thermometer.
a—Raw milk inflow to regenerator.
b—Milk flow from regenerator into pump.
c—Milk flow from pump and clarifier or filter into heater.
d—Heated milk flow into holder tube.
e—Sub-temperature milk flow into raw milk line.
f—Pasteurized milk flow into regenerator.
g—Pasteurized and cooled milk flow to bottle filler rising to a point higher than that of any raw milk flow in the unit.

pump-stop switch is intended to prevent the forward flow of imperfectly pasteurized milk if the thermostat fails or any other irregularity arises which causes the milk to drop below the pasteurizing temperature. Since all existing installations have unheated and uninsulated holder pipes, the diversion device located at the holder outlet is necessary. The diversion device or pump-stop switch should be set so that, during the period of falling temperatures, the milk flow will be diverted or the forward flow stopped before or when the temperature reaches the predetermined minimum, and so that the forward flow will not be resumed until such temperature is again reached.

Daily checking of the cut-out and cut-in responses by the plant operator is necessary. If this setting is sealed, the plant operator cannot change it without the knowledge of the health officer. The proper location of the diversion device bulb is immediately upstream from the diversion device during the pasteurization process. If the flow-diversion device operates fully automatically, it will be impossible to start the forward flow of milk before the temperature of the bulb is at or above the cut-in setting.

All of the milk must pass through the flow diversion device. This device must be so designed and installed that, when the milk is being diverted, sub-temperature milk can not enter the forward-flow line. In the case of a valve-type diversion device, which is the common type, a leak escape groove must be located on the forward flow side of the valve seat with the leakage draining completely outside of the valve body. The flow diversion device should be designed so that in case of power failure the flow of milk will be diverted automatically. The diversion valve is the main safety control on the unit and consequently it is imperative that its construction be such that its proper operation will always be assured. All parts should be of corrosion resistant metal. A corroded valve stem may cause the valve to stick in the forward flow position when the temperature has dropped below the pasteurization temperature. Should that happen, the pen on the recorder would register a cut-out, because the power would be cut out, yet the valve plunger itself would be in the forward flow position. The nut, with which the travel of the valve plunger is adjusted, should be locked in place after the travel has been properly set. Then it cannot become loose and turn thereby causing the travel of the valve to change so that it will not completely close when in the diverting position and thus allow sub-temperature milk to pass into the forward flow line. At the present, an improvement is being made, so that the diversion recording pen will be actuated from the valve plunger instead of from the diverting mechanism. The pen will then show the exact position of the valve plunger at all times.

The efficiency of the diverting valve depends to a large extent on the speed of operation because, if the action be slow during rapidly falling temperatures, a considerable amount of sub-temperature milk could pass the valve before the diversion occurs. The diversion-device controls must be combined with the recording thermometer, which registers temperatures and cut-in and cut-out responses, and must be actuated by the same bulb system. The cut-out device and pen arm must operate independently.

Frequent checking of the thermometric lag of the combined recording and control equipment is advisable because the lag may vary on account of difference in pen pressure or smoothness of chart paper, or on account of the depth of the immersion of the bulb.

The checking is done by adjusting the recorder to read correctly at the pasteurizing temperature.

The recorder combined with the diversion mechanism must meet these requirements for recorders located in pasteurization pipe lines.

1. A scale range of 150 to 200 deg. F.;
2. Smallest scale division not more than one degree between 157 and 162 deg. F.;
3. Length of scale division at least 1/16 in. between 159 and 162 deg. F.;
4. Smallest time scale division of not more than ten minutes;
5. Length of time scale division not less than $\frac{1}{4}$ in. between 159 and 162 deg. F.

The indicating thermometer should be located as close to the recording thermometer bulb as possible and also meet the requirement of indicating thermometers located on pasteurization pipe lines, such as:

1. Etched line on stem at 160 deg. F.;

2. Apparent width of mercury column not less than 1/16 in.;

3. Scale range 138 to 165 deg. F. with protection for sterilization;

4. 0.5 deg. F. scale division, not more than 8 deg. F. per in.;

5. Comply with thermometric lag requirement.

The indicating thermometer, not the recorder, is to be used as an index of the temperature by the plant operator. The temperature shown by the recorder should be checked daily against the temperature shown by the indicating thermometer by the plant operator and recorded on the chart. The recorder must at no time read higher than the indicating thermometer. When the diversion device is in the forward flow position, the indicating thermometer and recording thermometer chart must, at all times, read not less than 161 deg. F. or at whatever the designated pasteurizing temperature may be.

The holding time is dependent upon the size of the holder pipe, the pressure and vacuum, and the speed of the pump. In the case of the gravity flow holder it is dependent on the slope of the holder. Immediately after installation or any repair or change in the equipment, testing of the holder for compliance with the holding requirement is necessary. This is done by running water through the system at the pasteurizing temperature with all flow-im- ling devices open to their fullest extent.

The test is made by injecting a dye or starch solution into a pet-cock at the holder inlet and taking samples at one-second intervals from a pet-cock just ahead of the diversion device. This test should be repeated with the valve in the diverting position. In some cases, especially where diversion is to the suction side of the pump, the rate of flow increases during diversion because the milk does not flow through either side of the regenerator, but circulates from the pump through the heater, through the holder and back to the pump again. When diverting to the raw milk surge tank, the operating pressure is reduced during diversion because the milk does not pass through the pasteurizing side of the regenerator. When the holding time is less than desired during diversion, the condition can be remedied by putting a stainless steel disk, with a proper size hole, in a joint of the diverting pipe to build up the pressure and increase the holding time.

Maintaining the required holding period necessitates the use of a positive milk pump, geared directly to a constant speed motor. Any variable speed gears or pulleys must be sealed so that the speed of the pump cannot be changed without the knowledge of the health officer.

The holding section of the "short-time" system must be so designed that air or gases cannot accumulate in it and cut down the holding time. This can be done by the use af air vents at the pocketing points or by sloping the holder pipe constantly upward from the inlet to the outlet.

In most of the present installations, plate type milk-to-milk regenerators are used where both the raw and pasteurized milks are closed to the atmosphere. At all times, the pasteurized milk must be automatically maintained at greater pressure than the raw milk in the regenerator. The overflow in the raw milk surge tank must be below the level of any raw milk passage in the regenerator. If the regenerator is not self-draining, hot water, chlorine solution, or previously pasteurized milk must precede the raw milk and be coming out at a point open to the atmosphere above any raw milk passage in the unit before the raw milk is admitted to the regenerator. The positive-type milk pump shall be located between the raw milk outlet of the regenerator and the holder inlet. There shall be adequate storage of pasteurized milk above the raw milk in the unit to compensate for a one-hour leakage period.

In case milk-to-water-to-milk regeneration is used, it is necessary to have the heat transfer water under greater pressure than the raw milk at all times. This can be accomplished by having the highest point of the heat-transfer water circuit in a covered tank at a higher elevation than the top of the raw-milk section of the regenerator; by having no heat-transfer water pump located upstream from such tank and downstream from the heat-transfer water inlet to the raw-milk section of the regenerator; and by having the heat-transfer water circuit full of water at the beginning of the run and automatically maintained at this level as long as raw milk is present in the regenerator. A detailed discussion of maintaining proper relative pressures in regenerators is incorporated in the 1939 U. S. Public Health Service Milk Ordinance and Code.

The purpose of maintaining this pressure differential at all times is to prevent the contamination of pasteurized milk with the raw milk in case of leakage. Single gaskets are not satisfactory separations between raw and pasteurized milk. Each gasketed chamber must be so constructed that in case of leakage the milk will drip on the floor and not leak into another chamber or section.

Satisfactory bactericidal treatment of the unit can be accomplished by circulating hot water through the entire unit so that the minimum temperature is 170 deg. F. for 5 minutes, or circulating chlorine solution through the entire unit for 5 minutes with a minimum of 50 parts per million at the outlet.

There is short-time high-temperature equipment on the market which meets the construction aspect of the second requirement previously emphasized, and, if properly installed and operated, will give results which are comparable to the low-temperature long-holding method with an adequate margin of safety.

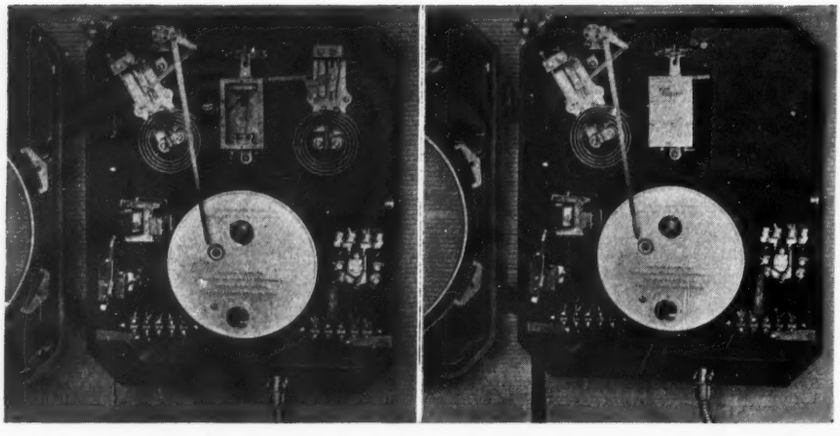

Fig. 3—Latest development in automatic control of diversion valve is a two-coil temperature controller-recorder in which the temperature recording pen is actuated through coil on left in controllers. The diverting mechanism is independently actuated through coil on right. A recording pen—not shown—indicates direction of milk flow. When coil at right is sealed by health officer as in B, the forward flow of milk at lower than pasteurizing temperature can not occur through manual operation of diverting valve.

A New Day in Fat Frying

By W. E. BROEG*
Parker-Broeg, Boston, Mass.

ALTHOUGH Mr. Broeg's article on frying gets partly out of the industrial food field into institutional cookery it is published for two important reasons. First, it shows the need for closer tie-up between shortening manufacturers and frying equipment makers. Second, it reveals a problem of the shortening and cooking fat industry relative to users of their products. And besides that, there is always a reaction of pious satisfaction that comes when some one else can shake out of a complacent attitude the professionals of the age old art of frying. This article should be read by all

Shortening Manufacturers
Meat Packers
Food Technologists
Most Married Men

THERE is no form of cookery where heat recovery is so essential as in the fry kettle. Therefore, the form of heat delivery to the fry kettle must be quick, responsive and dependable.

What Is French Frying?

French frying is immersion frying, or the cooking of food while immersed in hot fat. Deep fat frying is one method of French frying; shallow frying is the other method. Sautéing is pan frying, or surface frying, and should not be confused with immersion frying.

French frying is the most abused art in cookery. This is a strong statement, but after three years' survey of this branch in cookery, I am confident this statement can be sustained. Here are a few serious abuses:

Operators are greatly handicapped due to lack of proper instruction from equipment manufacturers, shortening manufacturers and purveyors of frying equipment and supplies in general. For example, there are five outstanding manufacturers of modern high temperature all-vegetable shortenings, or frying fats. They have done more to improve fried foods than any other contributor to this art because of their super product, but they upset the apple cart when they furnish information to the operator. These manufacturers stress the *importance of temperature control.* In this they are right 100 per cent.

Shortening manufacturer "A" states: "The importance of correct temperatures in deep frying: Next to using a superior fat, nothing is more important than having your fat at just the right temperature for the particular food you're frying."

Shortening manufacturer "B" states: "Temperature control is of first importance in caring for the frying fat."

Shortening manufacturer "C" states: "The proper control of temperature is of prime importance . . ."

Shortening manufacturer "D" states: "If you use our shortening and follow the table of correct frying temperatures given below, you'll find that your fried foods will be wholesome and good . . ."

"E" shows a frying thermometer on which is written: "Recommended correct temperatures for frying."

Now, how do they agree on temperatures? Take potato chips for instance:

A states: Fry chips at 375–385 deg. F.
B states: Fry chips at 300–330 deg. F.
C states: Fry chips at 360 deg. F.
D states: Fry chips at 395 deg. F.
E states: Fry chips at 325 deg. F.

Take clams, oysters and scallops:

A states: Fry at 340–360 deg. F.
B states: Fry at 380 deg. F.
C states: Fry at 360–370 deg. F.
F states: Fry at 375 deg. F.
L states: Fry at 395 deg. F.

Take French fried potatoes:

	Temperature, deg. F.	
	Blanching	Browning
A states:	360	390
B states:	325–335	375–385
C states:	365–370	395–400
D states:	395	395 (one operation)

These temperatures can't all be right; still, everyone agrees that temperature control is the all-important factor in frying. Does frying need standardization? Why not let's all get together on standardization of frying temperatures?

An authority on fat states: "Of first importance in caring for the frying fat is temperature control. Don't burn or scorch the fat by heating it to temperatures above 400 to 410 deg. F. Use thermometers or thermostats for controlling the temperature of the frying fat." With this information at hand, the operator reads the following directions written by a famous chef: "A temperature of 420 deg. F. is the best for frying all kinds of foods except potato souffle, where a temperature of 200 to 210 degs. F. is required, but 420 deg. F. is required as the 'happy medium' for everything else." The foregoing information conflicts and makes the operator wonder what it is all about.

Of What Value Is a Thermostat?

Another authority on fat states: "The temperatures given in the recipes are *the actual frying temperatures.* In frying, allowances should be made for the *drop* in temperature occurring when cold food is dropped into the hot fat." Another authority reverses these instructions as follows: "The temperatures given in the chart refer to the *temperature of the fat before the food is put in.* Naturally, the temperature falls as the frying commences. Make sure that the temperature is right *before* putting in each fresh batch of food . . ." As a result of such conflicting advice, it is safe to say that nearly every automatically controlled fryer is frying at the top of the thermostat dial. There are some exceptions, such as the larger doughnut manufacturers, the potato chip producers and some of the larger hotels and restaurants, all of whom appreciate the finer technic of frying.

Another Abuse

A manufacturer of codfish cakes prints on his label the following instructions: "Shape the contents into cakes of whatever size you prefer and drop them into a *pan of smoking hot fat.*" Bear in mind that animal fats smoke at approximately 350 deg. F. and modern high temperature all-vegetable fats smoke at approximately 430 deg. F., a difference of 80 degrees. If the operator is using the high temperature fats, then this instruction means another poor frying job. Broken down fat or fat that has

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been subjected to excessive frying temperatures will smoke at 300 deg. F.; therefore, smoke is not an indication of heat.

An English recipe given for domestic and commercial frying of fried fish states: "Although quite simple to cook, it is seldom done to perfection in the average *English household,* as deep frying is not understood by the 'plain' cook." To this statement I respond, "Check one hundred per cent, but let us include the American household as well."

Overloading the Fryer

Overloading is one of the worst abuses. At least 80 per cent of all fried food is fat soaked and soggy due to overloading. Every manufacturer of frying equipment should rate the capacity of his fryers in terms of orders per frying, and these ratings should appear on all literature published by them so that the operator may know what production to expect from the fryer which he purchases. What is an order? Here's a variable. One operator considers it 5 oz.; another, 6 oz.; and still another, 8 oz. How then can manufacturers correctly rate the capacity of fryers? By the capacity of the bottom of every fry basket, based on *single layer frying.* The best authorities in this art admit that single layer frying is the only way to fry foods properly.

An authority states: "Many foods can be cooked satisfactorily *only* by placing a single layer in the basket at a time. Depth of basket is not essential, for it is surface area that governs capacity." Another states: "Cook only enough food at one time to cover the bottom of the frying basket. Too much food lowers temperature." Good fried food cannot be produced when food is piled layer upon layer in any fry basket. The equipment manufacturer is at fault because he builds baskets so deep that they encourage overloading.

When manufacturers rate their fryers correctly, they will have made a real contribution to frying.

The deep fat fryer with its thermostat control is some improvement over the fry pot on the stove with no heat control, and some savings have been effected, but these fryers use a maximum amount of fat for a minimum amount of work. For example, several manufacturers of deep fryers build a counter model, the capacity of which varies from 12 to 16 lb. of fat. These fryers are supposed to produce two orders per frying, at 1 lb. of raw food per frying. The next size of deep fat fryer has a fat capacity of from 35 to 40 lb., and according to real authorities on production, this has a frying capacity of 2 lb. of raw food per frying, and so on in proportion. One manufacturer states: "If 10 lb. of sliced potatoes are fried at one time, it is advisable to have a kettle of 200 lb. of fat capacity." Another states: "One pound of sliced potato chips to 25 lb. of fat is about the correct proportion of chips to fry at one time."

In the new day in frying this is all wrong. Many so-called automatic fryers are only improved deep fat kettles on top of the stove.

You, who know and appreciate the value and efficiency of a high B.t.u. (heat energy) input, think this over. If you were called to boil two eggs quickly, would you drop them into a small pan with just enough water to cover the eggs and turn on the B.t.u., or would you put them into a large pan with 7 or 8 in. of water? You know the answer for speed and efficiency! Why not apply this exact principle in frying food? In other words, use enough fat to cover the food completely and then turn on the B.t.u. You know what the result would be in this case, because you know the definite effect of a B.t.u. on one pound of water. In the new day of frying, this value is applied proportionately to fat in the fry pot.

A large quantity of fat for a small amount of food to be fried is as obsolete as some of the old-fashioned heavy masonry bake ovens. The use of large receptacles full of fat is a carry-over from years of use of inefficient fuel with a low B.t.u. output rate, heating a large fat receptacle that really served as a heat reservoir, just as these same fuels discharged heat slowly to "store" heat into old-fashioned, heavy brick bake ovens.

Today, the modern engineer sees the fallacy of unnecessarily subjecting large amounts of fat to the abuse of heating, cooling down and heating up again with the resulting break-down. It is better to use smaller quantities of fat, more efficient B.t.u. input, smaller quantities of food, and maintain cooking heat more uniformly through more efficient heat transmitting elements. Put the heat directly and quickly into the small amount of fat, then into the product to be cooked, rather than into a large reservoir of heated fat that is expected to "hold" temperature.

The fryer of tomorrow will use a minimum amount of fat to produce a maximum amount of fried food. It will utilize more heat, use less fat, save real money, and do a quality job. Heat transmitting elements will be larger and more efficient.

Referring to one of the earlier statements that deep fat frying is one method of French frying, shallow frying the other method, let us consider shallow frying, taking into consideration that certain basic principles of frying must be adhered to in either method. Manufacturers of fine frying shortenings insist upon the following basic principles:

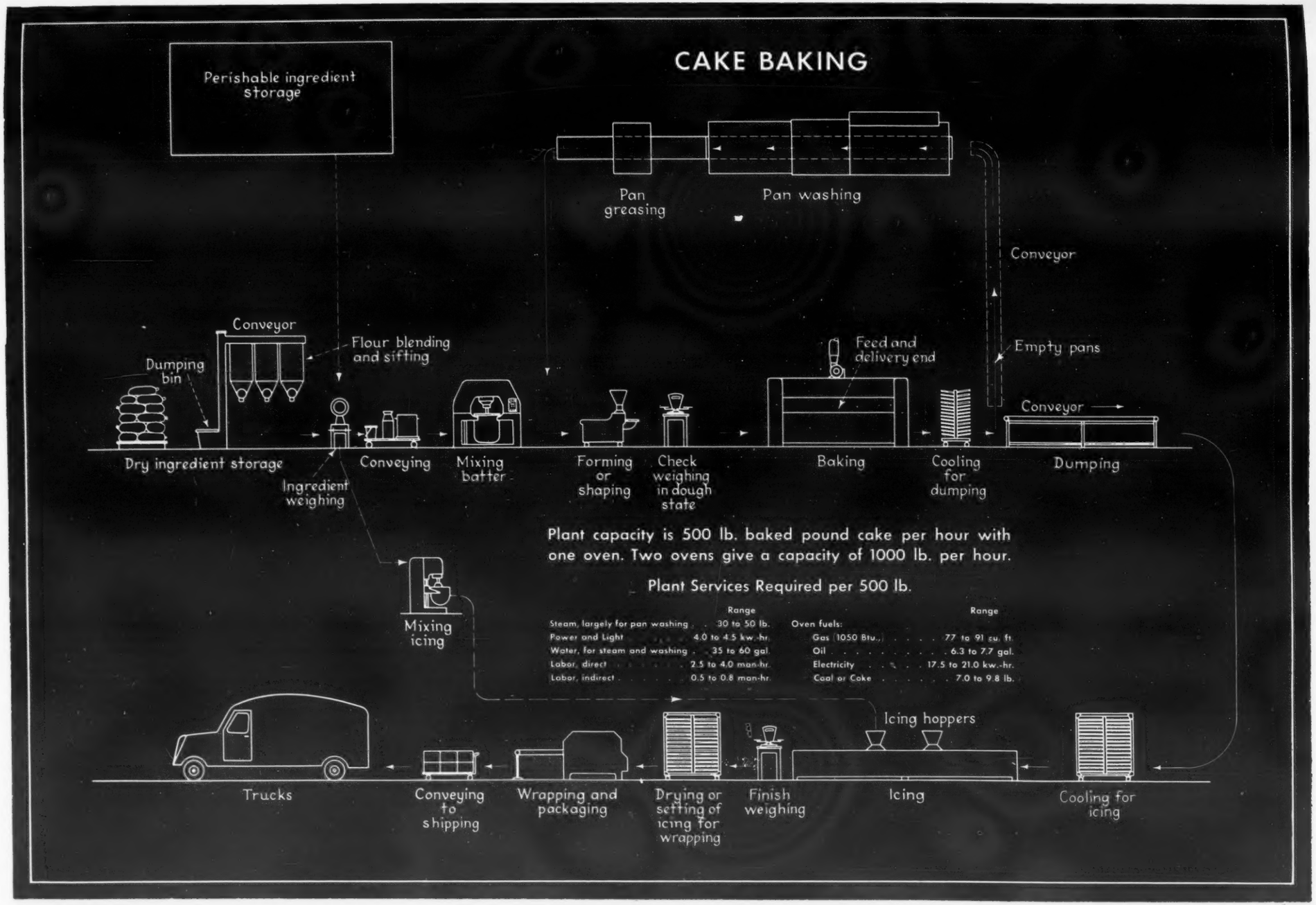
1. Satisfactory equipment.
2. The use of the proper frying fat.
3. The correct methods of preparing and frying the foods.
4. The proper care of the frying fat and frying equipment (cleaning frequently).

A shallow fryer is easy to clean. The savings of fat in shallow fryers justify frequent straining of fat and cleaning of the fryer. In other words, give the fryer coffee-urn care, and watch fried foods profits increase. Shallow fryers can have large or small surface areas to meet production requirements. Small battery shallow fryers solve short-order production, which is a present-day problem in every busy kitchen. Battery installations take care of rush periods and save heating large amounts of fat to maintain temperature in a large fryer for the preparation of straggling orders during off peak periods. This maintaining of temperature in a large body of fat for infrequent frying is very detrimental to the life of the fat.

Super-fat manufacturers realize the economy of shallow frying. Quoting: "For best results use a fry kettle which is not too large for the amount of food being fried, and use the smallest quantity of fat possible to fry that quantity of food." They also quote: "Any frying fat will break down when it is being held at approximately frying temperature." Why hold 35 lb. of fat at frying temperature when 10 lb. will suffice.

Shallow Frying Best

The food industry is hungry for better frying equipment and proper instructions for using that equipment. Efficient heat transmission will be an important factor in the better fryer of tomorrow. Modern high temperature-resisting fats will also be an important factor. Except for blanching, deep fat frying is obsolete. The watchword in the new day in frying is *shallow frying.* Make sure that the frying equipment you select for any frying job has the greatest single layer frying surface area to a minimum amount of fat and sufficient B.t.u. input to maintain correct temperature. Prepare your food properly, clean your equipment regularly and you will have attained "The New Day in Frying."


CAKE BAKING
Perishable ingredient storage
Pan greasing
Pan washing
Conveyor
Conveyor
Flour blending and sifting
Dumping bin
Feed and delivery end
Empty pans
Conveyor
Dry ingredient storage
Ingredient weighing
Conveying
Mixing batter
Forming or shaping
Check weighing in dough state
Baking
Cooling for dumping
Dumping
Plant capacity is 500 lb. baked pound cake per hour with one oven. Two ovens give a capacity of 1000 lb. per hour.
Plant Services Required per 500 lb.
Range
Steam, largely for pan washing . . 30 to 50 lb.
Power and Light . . . 4.0 to 4.5 kw.-hr.
Water, for steam and washing . . 35 to 60 gal.
Labor, direct . . . . . 2.5 to 4.0 man-hr.
Labor, indirect . . . . . 0.5 to 0.8 man-hr.
Range
Oven fuels:
Gas (1050 Btu.) . . . . . 77 to 91 cu. ft.
Oil . . . . . 6.3 to 7.7 gal.
Electricity . . . . . 17.5 to 21.0 kw.-hr.
Coal or Coke . . . . . 7.0 to 9.8 lb.
Mixing icing
Icing hoppers
Trucks
Conveying to shipping
Wrapping and packaging
Drying or setting of icing for wrapping
Finish weighing
Icing
Cooling for icing

How Foods Are Frozen In the Northwest

Operating practices—past and present

This report on

QUICK FREEZING

Is of value to processors of

Fruits, Vegetables, Meats, Fish and Poultry

Because it describes the birth, development and present operations of the great food freezing industry of the Northwest. Practical operating information, data and drawings on the methods and equipment used are presented in the form of case histories. To tell a story as big as this requires a series of three articles, this being the first.—The Editors.

By F. W. KNOWLES

Manager,
Northwest Baker Ice Machine Co.,
Seattle, Wash.

Part I

"THE West became refrigeration conscious because of the necessity of feeding Alaska." So said one of the deans of the cold storage business, Steve Collins. Steve started 42 years ago in the Pacific Cold Storage Co. and has kept a finger on the pulse of the refrigeration industry in the Northwest ever since.

Without doubt, this statement is somewhat correct, for it was even more important to get food into the men digging gold than it was for them to get gold out. At the time of the Gold Rush, we had been shipping refrigerated cargoes to Alaska from the Northwest for some few years.

The steamship Elihu Thompson had some refrigerated space and carried frozen beef to Alaska, mostly to Nome and St. Michael. There the meat was transferred to river steamers, principally the Lottie Talbott and the Robert Kerr, and taken up the river to the interior.

The steamship Portland, "the Ton of Gold Ship," carried some refrigerated space, and old-timers claim that lots of strawberries were frozen on the way North and eaten after thawing. We understand that a returned sourdough cook built up a famous chain of restaurants in Seattle, largely on the reputation of his frozen raspberry pie. The berries were frozen at the Diamond Ice & Cold Storage Co. and used as required. The chain of restaurants has disappeared entirely now, but memories of the famous pies still linger with those who ate them.

It is a considerable jump, however, from these small beginnings to where refrigeration can be applied to foodstuffs generally for sale all over the world, the situation we find today. Barreling, a highly important branch of this industry, started on a small scale in the Northwest about 1911 and made considerable progress through the years up to 1923.

DR. H. C. DIEHL

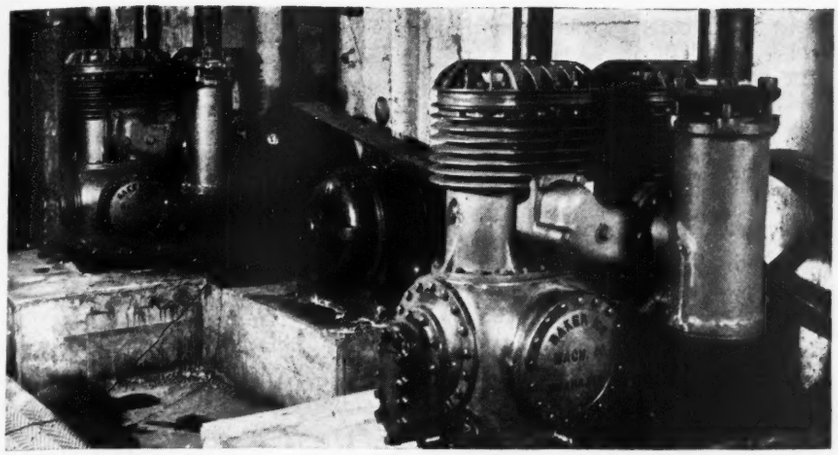
A large part of the Northwest's progress in freezing foods is traceable to the efforts of his department, the Seattle Frozen Pack Laboratory of the Department of Agriculture.

In that year, a surplus crop and no market led the farmers of the Northwest to appeal to the Department of Agriculture for assistance. The Department's answer was to send Dr. H. C. Diehl to the Yakima Valley to study the requirements of the industry the same year. A large part of the Northwest's progress in the frozen food art is directly traceable to the efforts of his department through the years since that time.

The cold storage locker system, which was started as early as 1917 in Washington, gave many locker owners an opportunity to experiment for themselves. And a great many people in the Northwest were eating frozen fruits and vegetables out of season during the winters long before commercial freezing started. Most of these vegetables were frozen unblanched, and apparently the "tired" taste of the unblanched products did not affect the desire of the locker owners to keep on trying.

Freezing vegetables for sale seems to have occurred to many people about the same time in this district. About 1924, Byron Stearns froze about 40 lb. of peas at the American Ice Co. in Everett. These were frozen without blanching and were thoroughly enjoyed by those who ate them shortly after freezing. However, the following year, about 500 lb. were frozen in the same manner—unblanched—and toward the end of the season the flavor got bad. It was so bad that people who ate the peas became thoroughly discouraged with the possibility of quick freezing peas by any method.

Mr. Stearns, however, continued his experiments, and finally American Ice Co. installed a small freezing system for vegetables and fruits, practically all of this freezing being done on trays in barreled berry freezing rooms. A large part of American Ice Co.'s freezing was done for Hershey Packing Co., Snohomish. This firm froze and shipped the first carload of Washington peas from the Snohomish Valley in 1932. The American Ice Co. has continued with the use of trays and cabinets in barreled berry freezing rooms up to the present time. Prac-



Two 30 ton booster compressors which supply refrigeration for freezing foods in the plant of R. D. Bodle Co., Seattle.

tically all of the Hershey Packing Co.'s pack goes through this plant. Chill blast air units have been added from time to time, so that at present this firm is among the largest of the Northwest vegetable freezers.

About 1929, Bozeman Canning Co. installed a small machine in its cannery at Mt. Vernon for experimental purposes. The experiments developed to a point where, in 1933, the company leased a large plant belonging to the Great Northern Railway, at Monroe, and started freezing operations at that point on a large scale.

R. D. Bodle Co. was one of the first berry freezers and had several plants around the territory, both in Oregon and Washington. Mr. Bodle was a consistent experimenter and, from the start of his freezing operations in 1917 until his death in 1938, put many new items on the market.

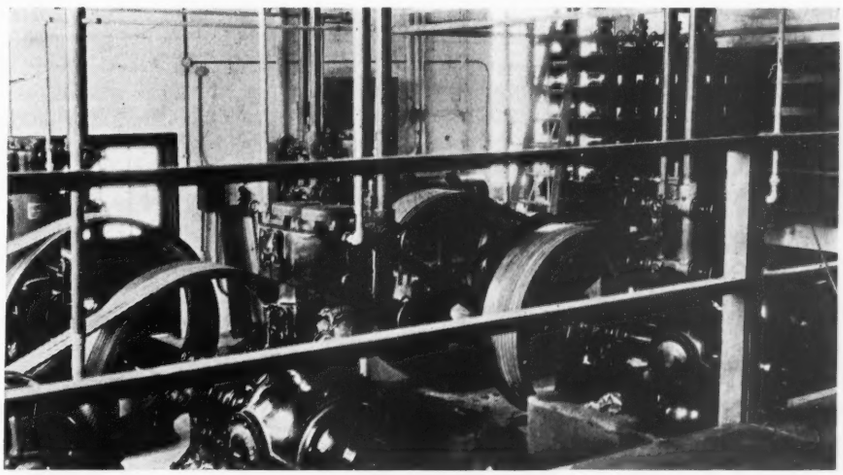
STARTING in 1929, Pacific Refrigerating Co., Tacoma, froze about 200 samples of corn and various other vegetables experimentally. More experimenting was carried on the following years, and in 1932, the company froze 21 tons of peas for Washington Frosted Foods Co., a branch of R. D. Bodle Co. These peas were frozen on bakery type trucks having about fifteen trays each, the trucks being wheeled into the barrel freezing rooms. This same firm froze more peas and corn the following years, and in 1934 it installed quite a large plant at Kent for freezing various products. This plant had 12,000 ft. of 2 in. semi-flooded coils in banks over a tunnel. Air was pulled through the coils by a fan and discharged down the length of the tunnel. Produce on bakery type trucks was pushed the length of the tunnel through the air stream.

About the earliest belt freezing was done at the Washington Packers plant at Sumner, where the plant superintendent, Ray Melhart, installed a small belt in 1934. The belt was constructed of materials picked up from about the plant, and Mr. Melhart borrowed a fan, belt and motor from the writer. About five tons of peas was frozen on this belt, enough to show that it could be done.

In the Melhart experiment, air for the freezing operation was taken from a low temperature room installed previous to the experiment, and also used for freezing berries in barrels. The belt was of ordinary fly screen, mounted on wooden spreaders which held it onto a link belt. Air was blown in between the top and bottom of the belt and directed upward. The following year, using the experience gleaned in the test belt, a belt 4 ft. wide and 40 ft. long was set up to freeze about one ton hourly. This setup was fitted with header type vertical finned coils having 4,200 sq. ft. of coil surface arranged in two sections (see Fig. 1). Cramped quarters and a belt that did not operate too well prevented this plant from working as satisfactorily as it should have. However, a great many peas were frozen that year, and the owners considered the operations so successful that the following year they put in a very large plant, which we will take up later.

In 1935, Bozeman Canning Co. built a 40 ft. tunnel having two belts, one placed over the other and running in the opposite direction. The belts were built of hardware cloth,* and the construction was rather elaborate. The company's many years of experience in canning peas was brought to bear upon the problem, and a very fine plant in front of the freezing tunnels was developed.

Produce, peas generally, is delivered from the cannery end onto the upper of these two freezer belts. Then it is carried to the end of the upper belt, dropped onto the lower belt and carried back to the point of entry. During the entire passage of produce over the two belts, the peas are subjected to a blast of very cold air, generally around –20 deg. F. and as low as –50 deg. F. The air is delivered from a 25 hp. fan into the space between the belts and is allowed to pass through the belts. At peak periods each belt may have 1½ to 2 in. of peas spread upon it.



Refrigerant compressors in the engine room of Bozeman Canning Co., Monroe, Wash.

The original plant was equipped with 14,000 ft. of 1¼ in. semi-flooded coils, arranged horizontally but set on vertical headers and fed across from inlet header to outlet header by a 3 hp. ammonia pump. The ammonia pump draws low temperature liquid ammonia from a low pressure receiver-accumulator and pumps it through the coils and back into the low pressure

* Hardware cloth refers to braided metal belts or round weave metal conveyor belting.

receiver-accumulator, where the liquid and accumulated vapors are separated. The correct level of the liquid ammonia in the low pressure receiver-accumulator is maintained by float control. The suctions of all compressors are hooked into this receiver-accumulator, and a suction pressure of from 15 lb. to 7 or 8 lb. absolute pressure is maintained.

The "high side" equipment of this plant consisted originally of two 100 hp. compressors and two 75 hp. compressors, a total of 375 hp. Additional compressor capacity was installed for storage purposes. With minor changes, this plant operated for three seasons, reaching a peak, in 1938, of practically 1,000 tons of peas frozen, besides minor quantities of other products. The highest day's run was approximately 37 tons in 22 hours.

In 1938, an additional 60 hp., 15x10 in. York booster compressor was added, making a total of 435 hp. With this equipment, the plant reached a peak of approximately 47 tons of peas frozen in one day of 24 hours. These peas were generally brought to 17 or 18 deg. F. in the tunnel. They were then packaged and put immediately into a –10 deg. F. room, where the temperature of the stored produce is gradually brought down to that point.

Defrosting of the coils, always a problem in air blast plants, was originally performed by opening outside doors and using the fan to blow fresh air from the outside through the entire bunker and tunnel. This last year, however, a steam coil was placed under the bunker coil and air was simply recirculated through the bunker coils and tunnel and over this steam coil. This aided greatly in defrosting. A great deal of study on the part of the owners has developed an exceptionally effective handling operation, and handling costs to and from the freezing tunnel should be low.

The Washington Packers, Inc., at Sumner, set up their second belt in 1935. This belt was run one year and then changed to the present plant. The original set of coils on the 40 ft. belt was then used on an air blast room freezer for freezing packaged goods on trays. The new tunnel, which was very similar to the belt arrangement used by Bozeman Canning Co. at Monroe, was equipped with four 30 ton Carrier air blast units. These units delivered air between two belts which operated in opposite directions, similar to the Bozeman type belt. The air blast units operated intermittently, any one of them being cut out for defrosting at any time convenient. A tank and pump were installed, the intention being to defrost with salt brine. After a few minutes' operation on defrost service, however, the brine got so cold it was necessary to install a steam coil in the brine tank to heat the brine for defrosting. This cured most of the defrosting difficulty, though a wider coil spacing was provided the following season.

High side equipment in this plant consisted of two 100 hp., 3 cylinder, 9x9 in. compressors, one 50 hp., two cylinder, 9 in. compressor, one 25 hp., 7x7 in. compressor and four 7½ hp. air blast fan units, making a total of 305 hp. A peak freeze of 48 tons in one day was reached by this plant during the summer of 1938. A very large and complete cannery operation is installed along with this freezing plant, this being another firm which has had many years of cannery operation experience.

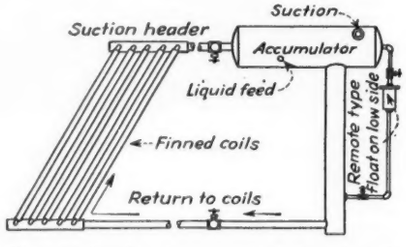


Fig. 1—Header type vertical finned coils used to refrigerate the air in the air blast belt freezing system installed by Washington Packers, Inc., Sumner, Wash.

Pacific Refrigerating Co., Kent, found operating expenses too high after completion of its 1935 season, so in 1936 it remodeled its entire plant. A low resistance type galvanized coil, similar to that in Fig. 1, having a total of 8,400 sq. ft. of surface, was installed with two fans, each with a capacity of 40,000 c.f.m. These fans were angle up, blast type, driven by 25 hp. The belt was approximately 80 ft. long and 4 ft. wide. The belt was of the conventional type of reduction gear drive, made of hardware cloth and designed to revolve its entire length in 20 minutes or less. An additional tunnel was placed alongside of the belt tunnel for package freezing.

The package tunnel was somewhat different. Here a series of skeleton shelves, each having wooden rollers, was built. Trays placed on the wooden rollers were filled with packages and pushed from the entrance end to the exit end, the food being frozen in transit. This type of tunnel has the advantage of holding a large amount of produce at one time, but it has the disadvantage of very slow freezing. Five pound packages in a tunnel of this type require 12 hours to completely freeze.

The refrigeration equipment on this particular plant consisted of two 75 hp., 10x10 in. York compressors and three 50 hp., 11½x8 in. Frick booster compressors with necessary auxiliary equipment, making a total of 400 hp., including the fans.

No figures are available as to the exact quantities frozen per day. The plant functioned in a satisfactory manner and a great deal of produce was frozen for various people. Most of the Washington Frosted Foods pack for the year 1937 was frozen at this plant. Operations in 1938 started in late April on asparagus and ran through the balance of the entire year. In 1938 some additional coils were added, and in that year this plant froze slightly over 2,000 tons of various vegetables, with a daily peak of about 40 tons of peas.

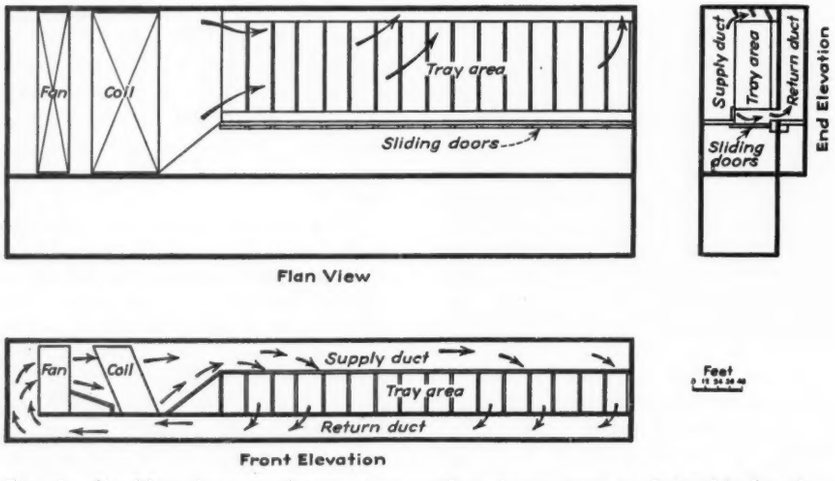


Fig. 2—Air blast freezer of tray type used to freeze peas at Columbia Ice & Cold Storage Co.

Parts II and III of this article, continuing the discussion of freezing methods in the Northwest, will appear in subsequent issues of FOOD INDUSTRIES. — THE EDITORS.

Germicidal Properties Of Hot Paraffin*

Part II†

By

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and

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Significance of "Sterilization"

FOOD containers should be clean and carry a reasonably low number of bacteria. There is no need for them to be sterile in the surgical sense, *i.e.*, absolutely free from all living microorganisms, because few foods are sterile. Other conceptions of the term "sterile" have grown up in the food industry. For instance, a joint committee of the American Public Health Association in 1933 (Holmquist, chairman) defined the term for the dairy industry as follows:

"The word 'sterilization' as used here and as it has been used for years in dairy work means bactericidal treatment resulting in the devitalization of milk-borne pathogens and the further material reduction of all other bacteria."

This is a reasonable definition and may readily be used in other parts of the food preservation industry. Hot paraffin wax is in this sense a sterilizing agent. Paper and paperboard are "sterilized" by coating with hot paraffin. It is well to point out here that paperboard is itself "sterile" in that it contains no pathogenic bacteria but a low number of harmless species which have survived the process of paper making or have been picked up from the air.

Hot paraffin wax shows such germicidal properties when applied even to inoculated paperboard that reliance should be placed on it to help produce a sterile container.

Where paraffin is applied to regular stock with the few bacteria which it contains, a paraffined paperboard is secured which is practically devoid of microorganisms. Only harmless spore-forming bacteria survive, and these in very low numbers. Containers made of paraffined paper and board carry practically no bacteria, while foodstuffs placed therein may contain many thousands. For instance, the milk ordinances of some cities permit 30,000 bacteria per cubic centimeter of milk. A quart of such milk may then have over 27,700,000 bacteria. The container has usually only one or two which are available to the milk.

Bacteria in Paraffin Baths

When the bactericidal properties of hot paraffin wax became of interest, attention was turned to the presence of living microorganisms in paraffin baths. It was suggested that if these baths became infected with bacteria, these would be picked up by the paper passing through the bath subsequently. Consequently, bacteriological examinations have been made of several paraffin baths on machines in commercial operation. In one instance, over 100 samples were collected every 15 minutes from the paraffin bath on a machine on which paper milk bottles were being waxed. The temperature of the bath was 78 deg. C. (172 deg. F.). In only one culture tube did growth appear, and this may reasonably be attributed to contamination, for all of the inoculations had to be made beside the machine under conditions which were unfavorable for bacteriological work. These experiments have also been repeated under other conditions with different machines. All of the cultures remained sterile, indicating the absence of living bacteria in paraffin baths which are operating at temperatures of 71 deg. C. (160 deg. F.) and above.

Additional information on this topic has been made available by Dr. Wheaton of American Can Co.‡ In extensive experiments on the germicidal effect of hot paraffin wax when used for coating paper milk containers, Dr. Wheaton passed containers which had been inoculated heavily with *Escherichia coli* through a paraffin bath with uninoculated containers. He desired to determine whether a paraffin bath operating at 79.5 deg. C. (175 deg. F.) could be seeded with bacteria and whether containers could be contaminated with such bacteria. He found that the uninoculated containers could not be contaminated in this manner and that even the inoculated containers were almost completely sterilized.

To return again for a moment to the work described in the historical section, much thought was given to the possible effect of hot paraffin wax on microorganisms. Under the conditions which obtained in these experiments, results were secured which seemed to indicate that hot paraffin could not be depended upon to show marked germicidal power. Later it was learned that these experiments created conditions which did not simulate practical conditions. The inoculum was much larger than should have been used, and the results were always qualitative. When a smaller inoculum was used, even then much larger than would be expected in practice, the hot paraffin wax did show a decided action. Attempts to follow the lethal action of hot paraffin quantitatively showed a very rapid decline in viable bacteria, with complete destruction in most cases in a few seconds.

IN addition to the actual lethal properties of hot paraffin wax, there are those which are physical and mechanical in nature. Paraffin is known to "embed" or "cover up" bacteria so that, should they be present on the base over which it is spread, they cannot be released. The inability of bacteria to pass through thin paraffin films has been demonstrated in the laboratory. Pure cultures of seventeen bacteria were used. In the first experiments a water suspension of the organisms was sprayed into the bottom of a sterile Petri dish; this was then dried in a vacuum desiccator. After complete desiccation had been attained, sterilized paraffin at 165 deg. F. (74 deg. C.) was carefully poured into the dish and allowed to harden. Sterile swabs were then rubbed at intervals over the surface of the hardened paraffin to determine whether the bacteria penetrated the paraffin films. In no case could presence of viable bacteria on the surface of the paraffin be proved.§

* Presented before the American Oil Chemists Society, Chicago, October 4-6, 1939.

† Part I was published in March, page 60.—The Editors.

‡ Private communication.

§ *We are indebted to R. A. Kaberg for these results.*

In other experiments, lightly vaselined glass rods were dipped into molten paraffin held at 165 deg. F. (74 deg. C.). After hardening, the thin paraffin sack was slipped off and placed in 70 per cent alcohol to harden. It was then placed in 5 per cent phenol for sterilization and rinsed with sterile water. This sterile paraffin sack was then slipped over the end of a sterile glass tube and sealed with more paraffin. It was finally filled with sterile broth and suspended through a cotton stopper in a flask of broth. The broth in the sterile paraffin sack was next inoculated with a pure culture of the seventeen bacteria used in the preceding experiments. After 48 hours, the broth in the flask was examined bacteriologically for the presence of cells of the test organism. In this test no flask was found which would indicate that bacterial cells can penetrate paraffin films.

MANY experiments have also been carried out on the effect of hot paraffin wax on bacteria both on strips of paperboard and on formed paper milk containers. The strips were heavily inoculated with various organisms and, after drying, heated in water and paraffin at different temperatures.

Use of strips has several objections which greatly affect the value of results. The ratio of cut edge to surface area is too large. When such strips are dipped into the suspension of the test organism, the interior of the board may soak up large numbers of cells, thus giving an inoculation within the paper which is not realized under practical conditions. When such strips are paraffined, air bubbles are forced from the interior of the paper. Bacteria are forced out in the same manner. This is indicated by the fact that when such strips are cultured in an agar medium, growth may be profuse around the edge of the strip but may be entirely absent on the board. Rice (1930, 1932) reported the same observations in his work with milk bottle caps.

It has been our desire to study the effect of hot paraffin wax on bacteria under conditions which existed in actual practice. In view of this fact, most later work has been done with formed paper containers made for milk. These were made of paperboard which had a very low bacterial content and consequently had to be inoculated with test bacteria. The results of one extensive experiment carried out early in 1939 will be briefly reported here.

Half-pint milk containers were heavily inoculated with *Escherichia coli* and an aerobic spore-forming species. The containers were inoculated by filling with a heavy suspension of pure cultures and then emptying. By weighing, it was estimated that each container has received over 200,000 of the test bacteria. The containers were then dried for two and one-half hours at 90 deg. F. to remove excess moisture. The bottles were then carefully paraffined at 74 deg. C. (165 deg. F.) and 79.5 deg. C. (175 deg. F.). The time involved was 20 seconds of preheating, 6 seconds of filling, 3, 5 and 7 seconds of immersion time, and 17 and 28 seconds of draining time. The draining temperature was the same as in the preheat period. Everything was as carefully controlled as possible. The cooling temperature was 10 to 15.5 deg. C. (50 to 60 deg. F.). The bottles were examined in different ways. Some were dissected under aseptic conditions, portions of the paperboard being disintegrated for analysis. Others were filled with milk and plain broth and stored at room temperature and at 4.5 deg. C. (40 deg. F.).

The disintegration tests showed that *Escherichia coli* did not survive the treatment briefly outlined above. No cells were viable when paraffination was done at either 74 deg. C. (165 deg. F.) or 79.5 deg. C. (175 deg. F.). Even with a short immersion time of only 3 seconds, *Escherichia coli* did not survive. Milk and plain broth from bottles (70) which had been inoculated with *Escherichia coli,* paraffined at 74 deg. C. (165 deg. F.) and stored at 4.5 deg. C. (40 deg. F.) and 21 deg. C. (70 deg. F.) did not yield this organism in a single instance. Milk from bottles paraffined at 76.6 deg. C. (170 deg. F.) yielded *Escherichia coli* in but few instances. The bottles which were filled with plain broth were entirely free from the organism. Bearing in mind that in such work much heavier inoculations are used than would be encountered in actual practice, the results indicate that paraffination of paper is distinctly germicidal and a practice with real sanitary advantages.

THE aerobic spore forming bacterium was used because it should have survived the treatment. It was used as a control. However, it was destroyed with almost the same regularity as *Escherichia coli,* showing again that paraffination is a germicidal process.

The authors wish to stress the importance of good technic and especially of good logic in experimental work on the effect of hot paraffin on microorganisms. To use a heavy suspension of cells, much heavier than the number which would be found in practice, is to render the experiments of little practical value. Quantitative results should be sought, for qualitative results might only show that one cell had survived to start growth in the culture tube.

ANOTHER warning should be given. To sterilize paperboard by high pressure steam and then subject it to paraffination gives results of questionable value. Steam sterilization changes the nature of the board and causes it to accept paraffin in a much different manner than regular untreated board. If results of experiments in laboratories are to be of help in practice, they must be secured under conditions which obtain in practice.

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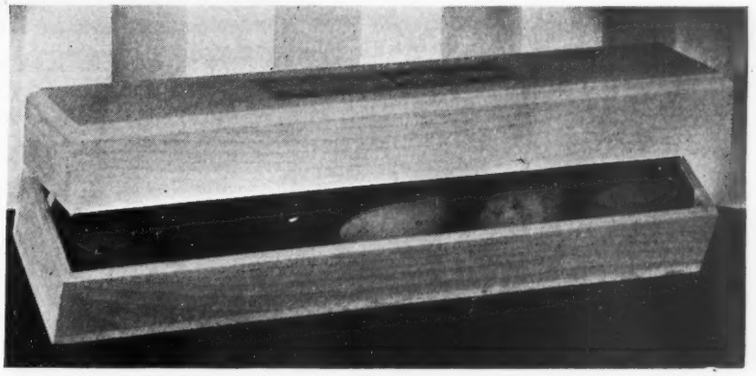
PRIZE PACKAGES

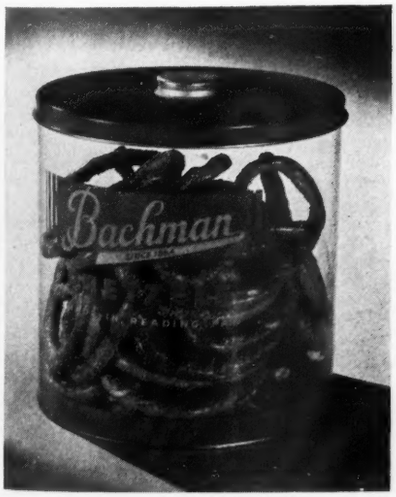
Food Packages Win Several Wolf Awards

FOOD PACKAGES developed during 1939 received more than one-third of all the awards in the Irwin D. Wolf Competition at the Tenth Packaging Exposition held in New York last month. Among more than 1,500 entries, food packages figured in the awards for thirteen of the twenty classifications. They rated 25 per cent of the firsts and 45 per cent of the honorable mentions. Prize packages are shown on this and the next pages.

Judges gave this package of McCormick & Co., Baltimore, honorable mention as the most effective redesigned package and as the package most effectively displaying specific buying information about the merchandise. Four 1/8 oz. vials of yellow, blue, green and red food colors, with a dropper and insert, are included in each carton.



The Knight Cocktail Bar, Knight Packing Co., Portland, Ore., took first place as the most effective combination sales unit. The wooden gift box holds 6 oz. glass jars of maraschino cherries, "ger-kin-ets," prepared mustard, cocktail onions and an 8 oz. jar of hors d'oeuvre spread.



Seidman Photo Service

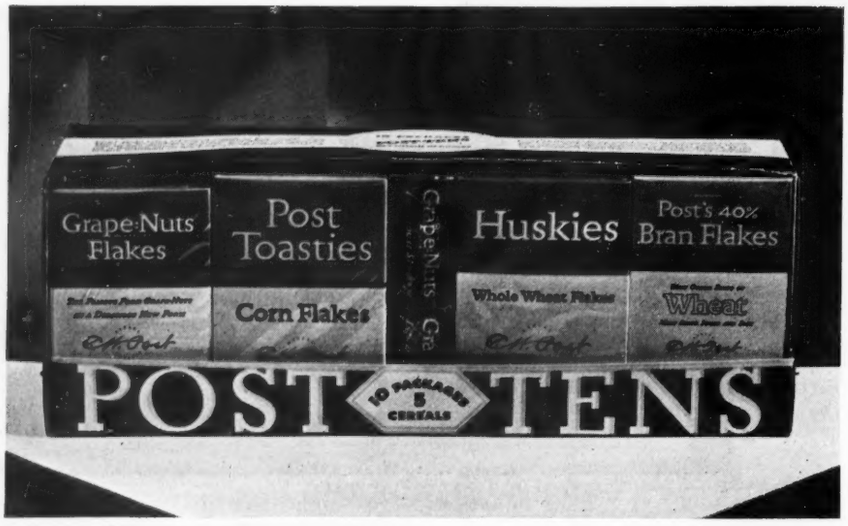
Bachman Bakeries, Inc., Reading, Pa., obtained two awards for their transparent pretzel container: first place for the most effective use of two or more packaging materials in one package and honorable mention for the most effective use of the elements of design to create shelf visibility.

This shipping container, entered by Krueger Beverage Co., Newark, N. J., rated first place as the most effective shipping container from the standpoint of the employment of printing and color to further good design. It carries a blue label on each side. Swirl bottles received honorable mention as the most effective family of packages.

Pictures of four more Wolf Award Winners are on the following page.

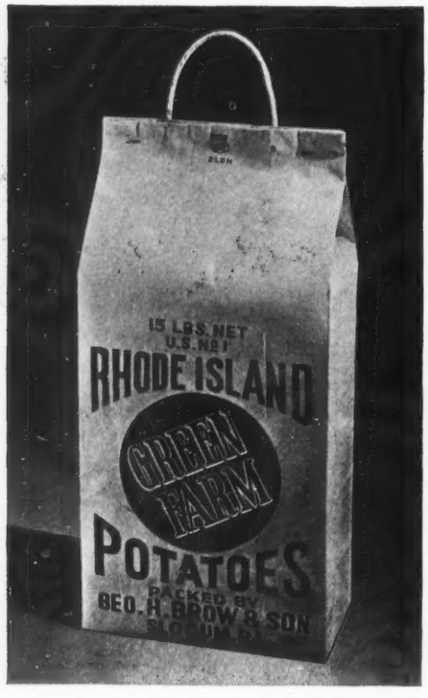
Seidman Photo Service

The Kingsway grapefruit juice can with a two-way label won first place for the most effective use of merchandising ingenuity regardless of artistic qualities. The product is distributed by Bruce's Juices, Inc., Tampa, Fla.



Post-Tens cereal unit, General Foods Corp., New York, received honorable mention as the most effective package designed to add to consumer convenience regardless of artistic qualities. The unit contains ten packages for individual servings of five cereals: Huskies, Post Toasties, Bran Flakes, Grape-Nuts Flakes and Grape-Nuts.

The Heinz package for preserved sweet pickles received honorable mention as the most effective use of inventive genius in package construction. The pickles are packaged in a transparent rubber hydrochloride wrap enclosed in a cardboard window display carton.



Potato package of General Foods Corp., selected for honorable mention in the same classification as Post-Tens Cereal unit.

Taking the Guesswork out of

PASTEURIZING

Research shows that the proper temperature at which canned or bottled fruit juices should be heat sterilized is lower than that generally used

By

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and

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STERILIZATION and pasteurization methods[1,2] for preservation of foods have been used for a long time, and as a result considerable experimental work has been conducted on such problems as the pasteurization of milk and the sterilization of meat and vegetable products. The canning of fruit is also an old, well-established industry; but the canning or bottling of fruit byproducts such as fruit juices is comparatively new, and therefore insufficient study has been given to their preservation to insure the retention of maximum flavor and to maintain quality control.

The primary purposes of the pasteurization of fruit juices are to kill all microorganisms which may develop in the product and thus change its character; and also to inactivate the enzymes which may cause deterioration. Pasteurization at too high a temperature may cause certain chemical changes which may alter the flavor, color or aroma, and may also cause certain physical changes which may affect the appearance of the juice.

In general, the more common method of preservation of fruit juices has been by the use of heat. However, there has been considerable agitation of late for the use of methods other than heat sterilization for preservation, the main criticism being the effect of the heat on the flavor of the pasteurized juices. Filtration through germ-proofing filters has been used to some extent. The addition of various preservatives, particularly sodium benzoate and sulphur dioxide, is common. A number of other methods have been introduced of late but none have been generally accepted. In the opinion of the writers many of the faults attributed to pasteurization have been due to improper procedures. This discussion will be limited to methods of preservation by heat.

The temperature of pasteurization is, of course, a function of time. The two extremes of pasteurization based on time and temperature may be used; one a low-temperature heating for a relatively long period, the other a high-temperature heating for a short period, one minute or less. For example, although a certain juice may be successfully preserved by heating to a temperature of 150 deg. F. for 30 minutes or even 135 deg. F. for several hours, the same juice may be preserved by flash pasteurizing at 170 deg. F. for one minute. In fact, a recent development in flash pasteurization uses pressure to force the juice through the heating coils, which necessitates exposure to an even higher temperature.

This article on

PASTEURIZING

Is important to processors of

Beer, Fruit Juices, Milk, Sirups, Wine

Because it deals with the effectiveness of pasteurization in reducing the number of living microorganisms in the liquid without damage to flavor or other quality factors. Results of research are given, showing the results obtained with various temperatures and times of exposure and the effect on sterilization of the presence of acids or preservatives.—The Editors.

A second consideration in the pasteurization of fruit juices is the nature of the microorganisms which must be killed. This not only involves number but also the types encountered. Vegetative forms of yeasts and bacteria are readily killed in the acid fruit juices, but the spores are far more resistant. However, the spore-forming bacteria are unable to grow in many of the acid juices and therefore do not constitute a serious problem. Mold spores are no more heat-resistant than the yeasts and bacteria; but since mold spores are waxy in character and tend to float, especially in foam or surface film, they are not readily killed. Mold spores require air in which to develop, so it is obvious that a juice will keep better if it has been well deaerated and vacuum-packed to exclude all traces of oxygen.

As the temperature increases during the pasteurization of fruit juices, there is a continuous killing of microorganisms. This was demonstrated by heating a juice in an open container and removing samples of the juice for plating at one minute intervals throughout the period of pasteurization. Temperature readings were also taken at the same one minute intervals using thermometers or thermocouples. Thus, for each time interval it is possible to obtain a temperature reading and the number of organisms surviving that temperature. However, it should be noted that the juice is at any temperature only momentarily. The pasteurization is therefore neither a flash pasteurization nor a holding pasteurization. This is the general method which has been used throughout the studies on pasteurizing of fruit byproducts.

By such methods, allowing for certain discrepancies in plate counts, it is possible to determine approximately the lowest temperature and time at which all microorganisms are killed, as well as the temperature and time at which the majority of organisms are killed and that at which killing first begins. For example, it has been shown in another report that during the pasteurization of McIntosh apple juice (Table I), the plate count is

[1] Approved by the Director of the New York State Agricultural Experiment Station for publication as Journal Paper No. 346, October 31, 1939.

[2] Food Research Division Contribution No. 468.

reduced from 175,000 per cubic centimeter to 120,000 per cubic centimeter at 110 deg. F., the temperature attained in five minutes; to 82 per cubic centimeter at 146 deg. F., the temperature attained in twelve minutes; and to zero at 154 deg. F., the temperature attained in fourteen minutes. During further heating up to 177 deg. F., living organisms were not present in the juice as shown by platings. This does not necessarily indicate that all organisms were killed at 154 deg. F., but it may be assumed that they were killed shortly after this temperature was attained.

The pasteurization just discussed is a relatively short period for so-called holding pasteurization. It is conceivable that if all microorganisms present were of the same types as those killed at about 120 deg. F., effective pasteurization might be accomplished by holding the juice at this temperature for a longer period of time, that is, several hours. This has been found to be true in experiments on grape juice, the results of which will be published later. Although the microorganisms may be killed at such low temperature, there is no certainty that enzymes are entirely inactivated.

The temperature of killing during flash pasteurization is not so easily determined on an individual sample of juice, since the temperature changes are so rapid. However, in previous studies such results have been obtained during flash pasteurization of Delaware grape juice by varying the temperature. A ribbon pasteurizer was used in which the desired temperatures were obtained in approximately fifteen seconds. By changing the temperature in five-degree steps from 165 deg. F. down to 130 deg. F. and then back to 170 deg. F. (Table II), it was found that killing occurred at as low a temperature as 130 deg. F.; that the majority of organisms surviving temperatures at 150 deg. to 160 deg. F. were molds; and that 165 deg. F. was the minimum temperature that could be used for effective pasteurization. By holding the temperature constant for fifteen minutes, effective pasteurization was attained at 150 deg. to 155 deg. F.; in other words, at 10 deg. to 15 deg. lower.

Table I—Plate Count of Samples Taken During Pasteurization of McIntosh Apple Juice, 1935.*

Time of heating minutes	Temperature of juice °F.	Plate count per cc.
0	39.0	175,000
1	60.0	175,000
2	77.0	175,000
3	100.0	260,000
4	105.0	175,000
5	110.0	120,000
6	115.0	100,000
7	121.0	45,000
8	128.0	24,000
9	133.0	25,000
10	138.0	15,000
11	142.0	1,400
12	146.0	82
13	150.0	9
14	154.0	0
15	158.0	0
16	162.0	0
17	165.0	0
18	172.0	0
19	176.0	0
20	177.0	0

** From C. S. Pederson and D. K. Tressler, and. Eng. Chem. 30, 954, 1938.*

The effect of time upon temperature of pasteurization was demonstrated in pasteurization of Sauterne wine (C. S. Pederson, H. E. Goresline and E. A. Beavens, *Ind. Eng. Chem.* **27,** 1257, 1938). Complete killing of microorganisms was effected when a temperature of 124 deg. F. was attained, fourteen minutes being required to raise the temperature from 56 deg. to 124 deg. F. On the other hand, complete killing was accomplished at 106 deg. F. during a pasteurization in which four hours were required to raise the temperature from 60 deg. to 106 deg. F.

Foam or film on the surface of juices tends to act as a heat insulator. Organisms occluded in such foam are not heated to pasteurizing temperatures; in fact, living cells have been obtained from such foam, even though the juice was heated to 185 deg. F. This may account for certain losses, especially in the grape juice industry.

Heat is not transmitted uniformly throughout the juice when pasteurized in a kettle unless the juice is stirred, and therefore uniform killing cannot occur. Differences as great at 25 deg. F. have been recorded (Fig. 1) in various parts of a kettle during holding pasteurization of grape juice. As a result, living organisms were obtained when a temperature of 168 deg. F. was recorded; whereas, it will be recalled, when the juice was stirred complete pasteurization was accomplished in fourteen minutes at 154 deg. F. With thorough stirring (Fig. 2) a temperature difference of only a few degrees was noted in different parts of the kettle.

Since agitation is an important factor in uniform heating, pasteurization in bottles offers certain difficulties. During pasteurization in bottles, the rate of transmission of heat from the surrounding water to the center of the bottle varies with the size of the container (Fig. 3), as well as the temperature of the surrounding water and type of material in the containers. A temperature of 160 deg. F. is obtained in about eighteen minutes in a 4-oz. bottle, but approximately 35 minutes are required to attain this temperature in a quart bottle under the same conditions. Furthermore, agitation of the hot water in such a pasteurizer is just as important in obtaining uniform heating as is agitation of the juice in a kettle. Similarly, the temperature recorded in different parts within a single bottle of juice varies considerably. In our studies on pasteurization of Sauterne wine, 20 deg. F. differences (Fig. 4)

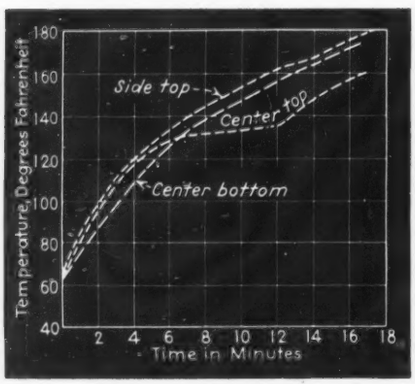


Fig. 1 — Time-temperature curves in pasteurization of Concord grape juice. The juice was not stirred. (From C. S. Pederson, E. A. Beavens and H. E. Goresline, Food Research *1, 325, 1936.)*

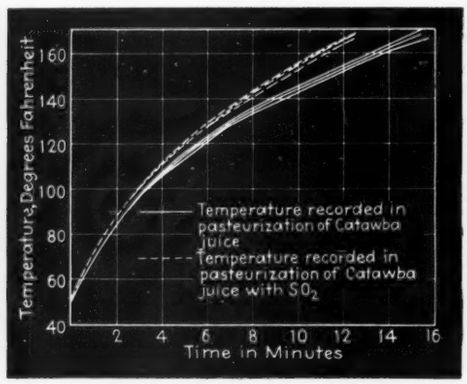

Temperature, Degrees Fahrenheit
Time in Minutes
Temperature recorded in pasteurization of Catawba juice
Temperature recorded in pasteurization of Catawba juice with SO_2

Fig. 2 — Time-temperature curves obtained in the pasteurization of Catawba grape juice. (From C. S. Pederson, E. A. Beavens and H. E. Goresline, Food Research *1, 325, 1936.)*

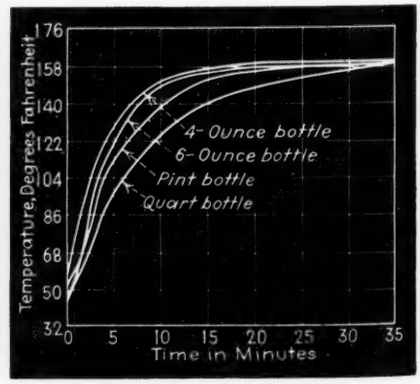


Fig. 3 — Transmission of heat to center of bottle of Concord grape juice in a bath at a temperature of 160 deg. F. (From C. S. Pederson, Food Research *1, 9, 1936.)*

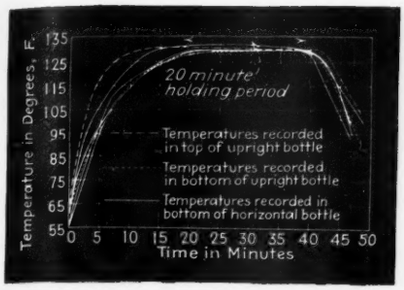


Fig. 4 — Time-temperature curves obtained in the pasteurization of Haut Sauterne wine at 130 deg. F. for 20 minutes. (From C. S. Pederson, H. E. Goresline and E. A. Beavens,* Industrial and Engineering Chemistry *27, 1257, 1935.)

were recorded in an upright bottle in a hot water bath. The cold region in an upright bottle extends upward from the bottom in a cone-like form.

Proper procedures for pasteurization can be set up if one observes the factors discussed above, but one must always consider the possibility of recontamination of juices and also employ, as a safety factor, a temperature somewhat higher than the minimum necessary for pasteurization.

This discussion has dealt with fruit juices of quite high acidities, that is, with pH of 3.0 to 3.4. It is a well-known fact that acid has a definite effect in lowering the required temperature for killing. In fruit juices of less acidity, such as California Muscat grape juice, pH 3.7, many spore-forming bacteria persisted at temperatures far above those required for pasteurizing more acid juices.

Alcohol has a marked effect in pasteurization. In studies on wine of about 12 per cent alcohol content it has been shown that 120 deg. to 130 deg. F. is sufficient to effect complete killing, while the grape juices from which these wines are prepared required a pasteurization of 150 deg. to 160 deg. F.

Sulphur dioxide and sodium benzoate are not used to a considerable extent, but they have a definite effect in pasteurization. In an earlier publication (*Food Research* **1**, 325, 1936) it was shown that, in Concord grape juice containing 50 parts per million of sulphur dioxide, organisms are killed at a lower temperature than in juice without the preservative. In a report on the pasteurization of apple juices, a similar effect was noted by the use of sodium benzoate or sulphur dioxide. A concentration of 0.10 per cent sodium benzoate or 20 p.p.m. sulphur dioxide may lower the temperature necessary for effective pasteurization as much as 10 deg. to 15 deg. F. (Fig. 5). Malic acid did not

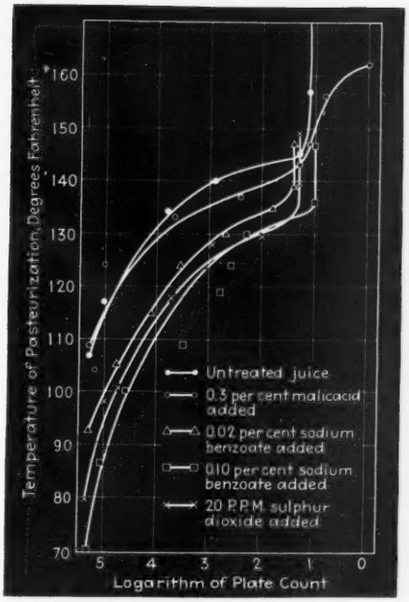


Fig. 5 — Logarithm of plate counts obtained in the pasteurization of Rome Beauty apple juices with the addition of preservatives. (From C. S. Pederson and D. K. Tressler,* Industrial and Engineering Chemistry *30, 954, 1938.)

have as great effect on the rate of killing, except that the spore-forming bacteria were killed more readily. This may have been due to the increased acidity.

Pasteurization studies have been conducted on juices prepared from a majority of fruits raised in the northeastern section of the United States. These have included juices from strawberries, raspberries, blackberries, dewberries, plums, peaches, prunes, pears, cherries, apples, grapes, quinces.

Grape juices are generally the most acid of these juices. Varieties grown in this section have shown variations in acidity from pH 2.85 to 3.26, or total acid content of from 0.65 to 1.72 per cent as tartaric acid. As expected, the temperature necessary in kettle pasteurization for complete killing of microorganisms in these juices is comparatively low, that is, 150 deg. F. This, incidentally, is apparently below the temperature required for inactivation of all enzymes, since definite enzymatic changes have been noted in juices pasteurized at 150 deg. to 155 deg. F., even though all microorganisms had been killed.

Table II—Effect of Temperature Variation on Plate Count in a Ribbon Pasteurizer on Delaware Grape Juice.*

Temperature deg. F.	Plate count per cc.
165	0
160	1 (mold)
155	31 (9 molds)
150	60 (30 molds)
145	131
140	553
135	2,800
130	12,000
	580,000 (original count)
135	1,000
140	436
145	266
150	42
155	11 (6 molds)
160	1 (mold)
165	0
170	0

Plate counts are from samples of a continuous flow of juice, temperature being varied by adjustment of steam-inlet valve. Approximate time of exposure to pasteurization temperature was 15 seconds.

* *From E. A. Beavens, H. E. Goresline and C. S. Pederson,* Food Research *3, 467, 1938.*

The juices prepared from apples, cherries and plums are slightly less acid than grape juices, and therefore slightly higher temperatures are necessary for effective pasteurization. Naturally, there is considerable variation in acidity between varieties of these fruits; the Greening apple, the Elliot plum or the Montmorency cherry is high in acid, while the King apple or Windsor cherry is low.

Juices prepared from peaches, pears, strawberries, blackberries and raspberries are ordinarily less acid, pH 3.3 to pH 3.8, than the juices previously discussed. It is common to find mold and bacterial spores surviving in such juices, even though the temperatures may be raised to 180 deg. to 185 deg. F. and the large majority of microorganisms have been killed at about 120 deg. to 130 deg. F. Such juices should be deaerated, heated to 170 deg. F., filled into containers so as to exclude air, and then held at 170 deg. F. for three minutes. Under such conditions the mold spores do not have an opportunity to develop and the juice is effectively preserved.

In conclusion, juices prepared from fruits raised in northeastern United States, usually quite acid, may be effectively preserved by flash pasteurization at 165 to 170 deg. F. Such temperatures are lower than those generally used in processing fruit juices.

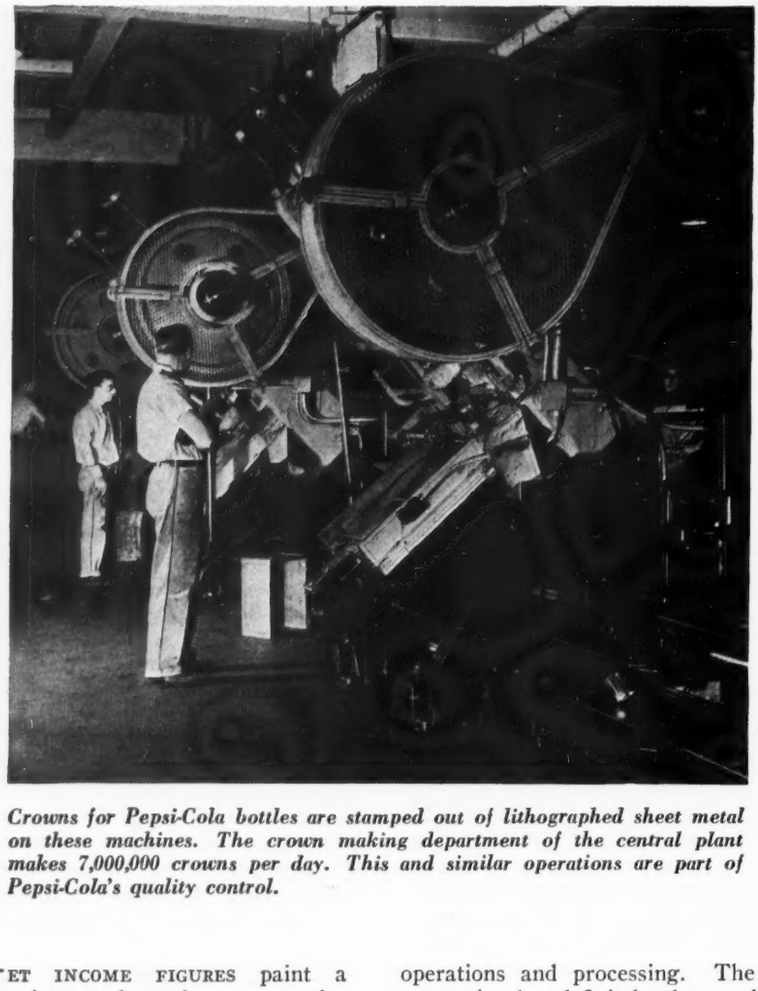
Precautions must be observed in regard to uniform heating in order to produce a sterile product.

Since mold spores may survive pasteurization, even at temperatures up to 185 deg. F. in the juices of lower acidity, it would seem advisable to deaerate juices and fill containers hot and full so as to exclude air.

These lower temperatures have been used successfully in experimental canning and bottling of various fruit juices

Fruit juices prepared and preserved by the use of flash pasteurization temperatures and the other precautions mentioned have shown less change in quality than similar juices prepared without regard to these factors.

Pepsi-Cola Gives Controlled Quality To 400 Franchise Bottlers



Crowns for Pepsi-Cola bottles are stamped out of lithographed sheet metal on these machines. The crown making department of the central plant makes 7,000,000 crowns per day. This and similar operations are part of Pepsi-Cola's quality control.

Ingredient water and finished beverage are tested regularly. Sirup concentrate, caps, cases and labels are made in central plant

By IVAN C. MILLER
Distribution Editor,
FOOD INDUSTRIES

NET INCOME FIGURES paint a picture of soaring success for Pepsi-Cola Co., Long Island City, N. Y. Here are the company's income figures for the last four years, before deduction of special settlement and legal expenditures, taken from the annual report to stockholders.

1936	$1,544,110.61
1937	2,264,253.85
1938	3,266,457.16
1939	5,650,139.31

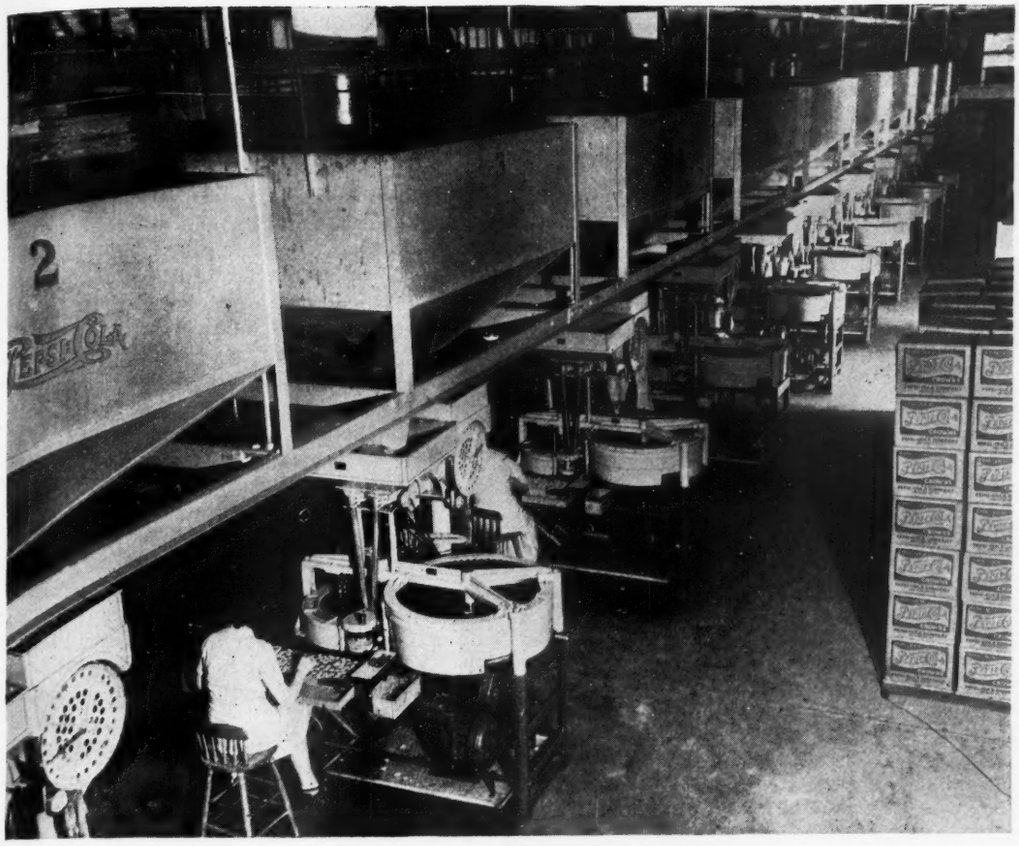
Few food companies can boast as enviable an increase in net income statements during these same years.

The company's year-by-year increase in net earnings is in part the result of increased efficiency in plant operations and processing. The increase is also definitely the result of expanding sales. And to no small extent, sales expansion can be attributed to quality control of the bottled drink in distribution.

From the purchase of raw materials, through processing and to the final drink bottled by 400-odd franchise bottlers over the country, the product is quality controlled. This requires the extension of quality control to cover the distribution of the bottled beverage. And one means of maintaining quality control in distribution is through quality control of the raw ingredients and processing, and through the manufacture and distribution of bottlers' materials.

Two ingredients of the sirup concentrate which the company furnishes franchise bottlers are cola nut extract and sugar. Cola nuts are imported direct from the West Indies and Africa and unloaded at the plant dock on the East River, where the nuts are ground and extracted. Pepsi-Cola is the only cola beverage sirup manufacturer which grinds cola nuts and

Crowns are counted by weight. A measured number of crowns accompanies each unit of sirup concentrate shipped to bottlers.

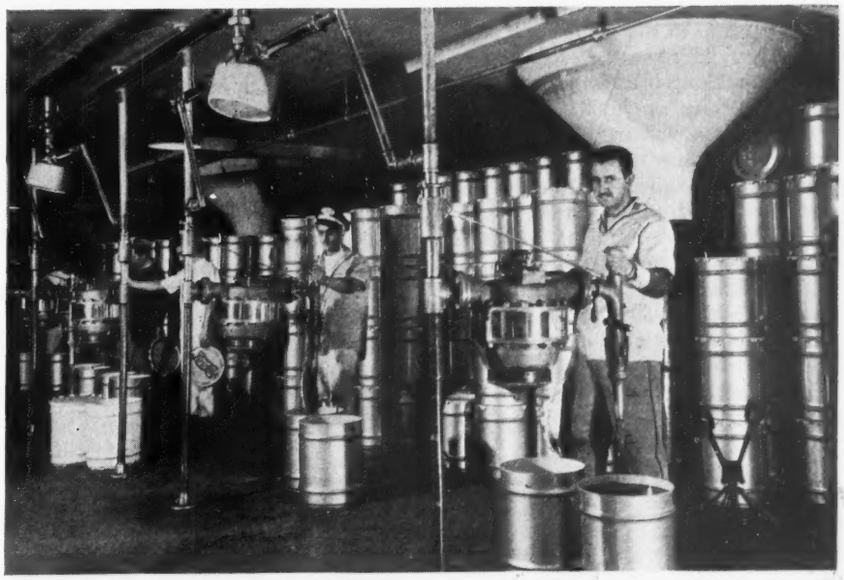


Here cork disks are glued in the stamped out crowns brought by conveyor from the stamping machines.

extracts its own cola concentrate in its own plant. This minimizes costs and permits a high degree of quality control of the product.

Raw sugar also is imported and unloaded direct from freighters into warehouses at the plant dock. These warehouses, with a 23,000,000 lb. sugar storage capacity, insure an adequate supply of raw sugar for the refinery where the raw sugar is converted to a sugar sirup concentrate. Producing the sugar sirup concentrate from raw sugar results in an economy in transportation costs as well as quality control over the sirup.

The company's sugar refinery is the largest in the country not operated by a sugar concern. Here impurities are removed from raw sugar which is then converted into sirup—50 per cent inverted— and filtered. The increase in total solids resulting from the inversion of 50 per cent of the sugar balances refining losses. The entire refinery operation assures plant efficiency and economy. It also permits accumulation and storage of a surplus of sirup concentrate during winter months for use during heavy summer month withdrawals. Quality control over sirup concentrates in storage is maintained through the use of selected-ray ultra-violet lamps (Food Industries, June, 1936, page 295; October, 1937, page 596; May, 1938, page 263). More than a million gallons in a single tank is thus protected from surface contamination and fermentation.



One-time-shipper light weight steel drums have replaced wooden kegs. They are leak proof and contamination proof. Drums are filled by volume by a filling machine adjustable for temperature variations.

The sugar refinery and large storage capacity for both raw sugar and refined sirup permit large economies as well as definite quality control. Ample raw sugar storage permits purchase of sugar in a favorable market. Sirup concentrate storage permits an accumulation against flush seasonal demands, at the same time allowing the refinery to operate economically on a yearly schedule with uniform output. Operation of the sugar refinery provides opportunity for both economies and quality control of the

concentrated sirup which is supplied to franchise bottlers.

The quality control over distribution is obtained by two systems. One is through supplying bottlers not only with the sirup concentrate from which the bottled beverage is made, but also through supplying most of the materials, other than bottles, which a franchise bottler needs in his operations. The other method is through constant laboratory checks on the quality of the final beverage bottled throughout the country. Both effect economies.

The company supplies franchise bottlers with coolers of standard design, either electrically refrigerated or ice-cooled. Metal signs and advertising material are furnished at a minimum cost. The parent company effects a large saving to franchise bottlers by manufacturing and supplying at cost the cottonwood cases used for delivery of the bottled beverage. Maximum quality at a minimum cost and uniformity are thus assured. The three production lines in the box plant (reputed to be the country's largest under-one-roof box plant) have a daily manufacturing capacity of 9,000 cases of 24-bottle capacity. Nail and strap iron requirements for this plant are measured in tons.

All crowns that cap bottled Pepsi-Cola are made in the company's New York plant. Here in the second largest crown-making plant in the country, with a capacity of 7,000,000 crowns per day, the crowns are punched from lithographed sheet metal, lined with sheet cork, weighed and sealed in cartons in measured quantities.

Pepsi-Cola also prints the body and neck labels for twelve of its own bottling plants and for more than 400 franchise bottlers in a label printing plant which can turn out 5,000,000 sets of labels per day.

Deliveries of sirup concentrate are accompanied by a measured supply of crowns and labels, with a minimum tolerance which experience has taught is ample to cover unavoidable waste in bottling. This is one of the controls over distribution which assure a quality and uniformity of the bottled beverage necessary to the success of both bottlers and parent company.

Raw sugar is unloaded from freighters at the docks along the side of Pepsi-Cola's plant in Long Island City and stored in warehouses. The sugar refinery is adjacent to the 23,000,000 lb. storage capacity warehouses.

Another means of maintaining quality control over the bottled beverage is through insuring against any change in the quality of the sirup concentrate between the time it leaves the parent plant and the time it is made into the bottler's sirup at the franchise bottler's plant. This is done through the use of a recently adopted one-time-shipper light-weight steel drum.

Before the adoption of the light-weight drum, the life of the sirup concentrate in wooden kegs was variable and limited. Wooden kegs were often damaged in shipment or during bottler's storage. Often they leaked. No control of in-the-bottle quality (based on a measured supply of crowns and labels proportional to sirup concentrate) could be maintained in face of sirup losses due to leakage. The new steel drum assures delivery of the total sirup shipment.

Before adopting the new drum, any imperfections in the paraffin lining of wooden kegs, which permitted contact of the sirup concentrate with the wood, encouraged a change of flavor. This prevented accurate control of the quality of the bottled beverage. The new steel drum lengthens the life of the concentrate manyfold and helps to assure uniformity of the bottled product.

Shipping the sirup in the form of a concentrate (approximately 20 per cent by weight of the bottler's sirup), to be converted by the bottler by the addition of simple sirup, effects an economy through the employment of a smaller, less costly shipping container.

Supplying, in measured quantities, bottlers' supplies manufactured under adequate quality control by the parent company is one method of maintaining quality control over the bottled drink. Another method is by a laboratory check of the bottled product.

Water for use in making bottled Pepsi-Cola is laboratory checked. Water must be brought to a standard quality before a franchise bottler's plant is acceptable (municipal water is generally preferable). Franchise bottlers send in samples of their bottled beverage twice a month, water samples once a month. Home-office field men send in regularly purchased samples from the field. A series of tests (eight in all) serves to maintain quality throughout the territories of the franchise bottlers.

Constant checking and testing to maintain quality is necessary. Such testing would involve a considerable expense for any one bottler. Conducted in a central laboratory for more than 400 bottlers, it is an economy for both bottlers and parent company. It insures a uniformity of product and a maintained standard of quality.

By these two methods, Pepsi-Cola Co. controls for the distributor the quality of the beverage bottled by franchise bottlers.

Twenty-four bottle boxes for all Pepsi-Cola bottlers are made in this plant, which has three production lines, each with a capacity of 3,000 boxes per day.

Sell the Consumer "400" First!

Clue to solution of consumer problems indicated by recent conferences in New York and Chicago

By IVAN C. MILLER
Distribution Editor,
FOOD INDUSTRIES

Women in business meet with representatives of organized women's groups, ask and answer questions and discuss mutual problems and interests.

LAST month Advertising Women's Club of New York sponsored an all-day meeting between some 2,000 clubwomen and representatives of business—manufacturers and distributors of consumer goods.

Those who attended were clubwomen from organized women's groups in New York, New Jersey, Pennsylvania and Connecticut. The list of women's associations represented is impressive: American Association of University Women, state and national home economic associations, city and state parent-teachers associations, state leagues of women voters, state federations of women's clubs, mothers' clubs and the National Council of Women. Hundreds of thousands of clubwomen were represented by the delegates who attended.

In the morning of the all-day session, these thousands of clubwomen, self-styled, "typical consumers," visited the exhibits of approximately 50 consumer-goods manufacturers, asked questions, satisfied curiosity. Some of the exhibits were those of food manufacturers, among them: Borden Co., Best Foods Co., General Foods Corp., Kellogg Co., National Biscuit Co. and Libby, McNeill & Libby.

The noon luncheon (at $1.50 per) overflowed the banquet hall. The afternoon meeting drew an audience of near 1,000. During the meeting both consumers and representatives of business had a chance to sound off. A short forum concluded this meeting.

The banquet in the evening ($2.50 per) was almost as well attended as the noon luncheon. A summary of who-said-what concluded the day's proceedings. The clubwomen left for home or their rooms, later to relay what they had learned—or thought they had learned—to thousands of their sister club members.

Thus ended the New York advertising women's first annual consumer council, through which formal recognition was given to the consumer movement by at least one small segment of business. During the same month, Chicago business women sponsored Chicago's second consumer conference.

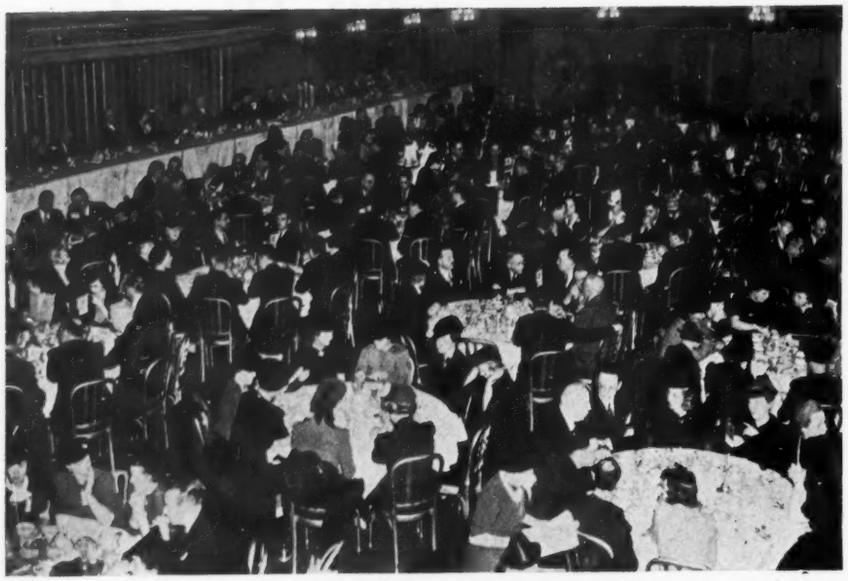
REFLECTION on these events raises many questions: Just what is the consumer movement? Who heads and directs it? When did it start? What started it? What is the movement's attitude toward business? Why should it be the women in business who first formally recognized the movement, and why should it be they who rise to defend business? These questions and their answers have an import for food manufacturers.

The consumer movement is a manifestation of dissatisfaction with the order of things. It sprouted soon after the formation of organized women's groups. It grew with them and rooted deep in most of them. Since the consumer movement's growth parallels that of organized women's groups, it has concerned itself with those consumer products close to the interests of women. The consumer movement has not yet concerned itself with the ingredients of chewing tobacco or with the number of threads on a monkey wrench.

The movement did not mushroom into existence in the last few years, nor is it the result of "anti" books and literature. These merely fanned into flame and made articulate a long smoldering rebellion against the existing order. This "anti" agitation did, however, point up the objectives—charted the course of the consumers' ship.

Because of the origin of the movement in women's groups and because the "cause" was supplied to pilot an uncharted course, the movement concentrated on consumer products and against the manufacturers who produced them.

The gathering dislike for the existing order of things might have vented its displeasure against war, against taxes, against politicians and political abuses or against any of our existing social customs. The fact that it has



The Chicago consumer conference was better attended by men than the New York meeting.

taken the course it has must be faced by those whose interests are involved.

This introduces the questions: "Why should it be the women in business who first formally recognized the movement with an attempt to bring consumers and business together? And why should it be they who rise to defend business?"

MOST women in business are clubwomen, or at least they are brought into constant contact with organized women's groups through their business activities. They, more than the men in business, more than top management, know what organized women think, say and do. Their attempt to bring together consumers and business for a better understanding is a defense measure. Business women feel intuitively that their jobs are at stake, or, what amounts to the same, that the business which gives them employment is threatened.

This apprehension on the part of women in business may not be justified—in fact, it may be a case of building mountains out of molehills. If business, through honest investigation, proves them wrong, that would at least justify the cost. However, these business women may be right. If they are right to the full extent of their contentions, business had better investigate honestly and thoroughly, because not only profits, but in some instances existence, may be at stake.

If the women in business have a sound basis for their contentions, then it should be important to know just who are the members of these organized groups intent on business scalps. Who are these individuals who business women insist must be inoculated with "consumer education" and brought into conferences with business? They are those women who can come from other states to attend an all-day meeting, pay $1.50 for lunch, $2.50 for a banquet dinner and in many instances stay overnight at a first-rate metropolitan hotel.

Whether they come at the expense of the local club organization or at their own, they are not representative of the under-privileged third, nor of the lower two-thirds or three-fourths to which belong the less articulate masses. Most of them, these leaders of organized women's groups, are of the upper 10 per cent—the mothers, daughters or wives of men in business. If there must be "consumer education," it would seem that it should begin at home.

These several consumer meetings sponsored by business women were conducted to give representatives of women's consumer groups a chance to meet with representatives of business to discuss mutual problems. The conference subject was "Let's Talk Business." Business was represented by a few men from associations of consumer-goods manufacturers. The women were 2,000 strong. Throughout the meeting there was much talk about "consumer education." Just how much "education" the clubwomen absorbed is beside the point. How much real education could have resulted if 500 food manufacturers had attended is the thing—there can be little doubt who would have been the beneficiaries.

Business—consumer goods manufacturers in person—did not turn out. Yet who hasn't heard the slogans of manufacturers of foods and other consumer goods? "Ask the consumer;" "Let the consumer decide;" "The consumer is always right;" "Take the problem direct to the consumer;" etc. Apparently it is management's belief that the only way to learn the views of the housewife is by means of a survey answered in the home. Can it be that there are housewives and HOUSEWIVES, consumers and CONSUMERS?

Maybe these clubwomen aren't "consumers," or possibly they are not, as they claim, "typical consumers." Possibly they should not be given credit for their boast of guiding the thinking of the majority of consumers. Nevertheless, through the power of mass votes which they claim to control, they are acting as pressure groups, lobbying in city, state and federal seats of government, often seeking laws inimical to the interests of business and the consumer. Their mettle has already been tested. Their strength is not unknown to manufacturers.

And so, the consumer-goods manufacturer meets lobby with lobby, when basically the interests of consumer, producer and manufacturer are one. As for lobbies, manufacturers should not be unaware that consumer lobbies are wholesome—other lobbies wicked.

It does seem that there is unnecessary lost motion when groups with common interests work at cross-purposes. It certainly would seem more advantageous to all to advance the mutual interests rather than continue at war. If mutual interests exist, why can they not be advanced? Before mutual interests can be established, however, there must first be understanding and adjustment.

BUSINESS in the past has spent generously, even lavishly, to discover the likes and dislikes of its customers. Surveys, tests, market studies and councils have been employed without stint of expense. Women are the customers, or they influence the purchasers of most consumer goods. They are now organized into groups more easily studied for likes and dislikes than would be possible as individuals. May it not just be possible that these organized groups offer an opportunity to food manufacturers rather than a threat?

Business feels that consumer groups have been sold a bill of goods by those antagonistic to business. Has business, whose cornerstone is salesmanship, let its No. 1 customer be unsold? What has become of the greatest offensive weapon of business—salesmanship?

Hints and Hurdles

Action Arrives on Schedule

IN THE SERIES of five articles on trade barriers, (FOOD INDUSTRIES, July '39, p. 390, August '39, p. 444, September '39, p. 500, October '39, p. 555, November '39, p. 361,) FOOD INDUSTRIES predicted action by the federal government to remove the multitude of state barriers to internal trade. Such actions, it was indicated, could only result in more federal legislation destined to exercise more regulation and more control of industry and of the food industries in particular.

The Department of Commerce has recently sponsored an interdepartmental committee, the function of which is to study "discriminatory" state laws. It is axiomatic that intensive government study or investigation of existing conditions or laws is preliminary scouting for the enactment of new legislation to increase the regulation and control of industry.

However, the formation of this committee to investigate trade barriers has a bright as well as a gloomy aspect. The presence of P. T. Truitt, former Sears Roebuck official, and Donald Montgomery, representing the consumer as "Consumers Council of AAA" on this committee, would indicate the probable death of fair trade legislation. Food manufacturers have not indicated any desire for fair trade laws, fixed prices and price maintenance of food products. They will at least welcome the committee's attempt to remove fair trade laws of the various states.

The Boomerang Strikes Back

EFFECTIVE in 1912, a New York City ordinance fixed the minimum standards qualifying milk distributed in New York City as Grades *A, B* and *C*. Grade *C* has long since been abandoned. New York City milk is now sold as "Grade *A* Pasteurized" and "Grade *B* Pasteurized."

Starting September 1, New York milk will be milk, just milk, plain milk, without labeled designation as to grade, according to a recent confirmation by the Board of Health "of its previous position that the Sanitary Code should be amended to provide for a single designation for milk sold in this city. In the future the Board will not object to trademarks appearing on bottle caps, providing no claims are made or implied as to the grade."

For years, many consumers have bought Grade *A* Pasteurized milk believing Grade *B* Pasteurized milk inferior, if not unsafe. The New York Board of Health recognizes "the reaction on the part of some consumers to the designation 'Grade *B*', a term which has, to many, implied sanitary inferiorities. Because of this, many families, often with limited incomes, have believed it necessary to purchase the higher priced milk in the belief that it was the only safe milk to use." And yet the Board of Health is satisfied "that the actual quality of the present Grade *B* milk supply in New York City is safe." As a matter of fact, during the last few years milk sold in New York City under the Grade *B* label has equaled or excelled the standards required for Grade *A*.

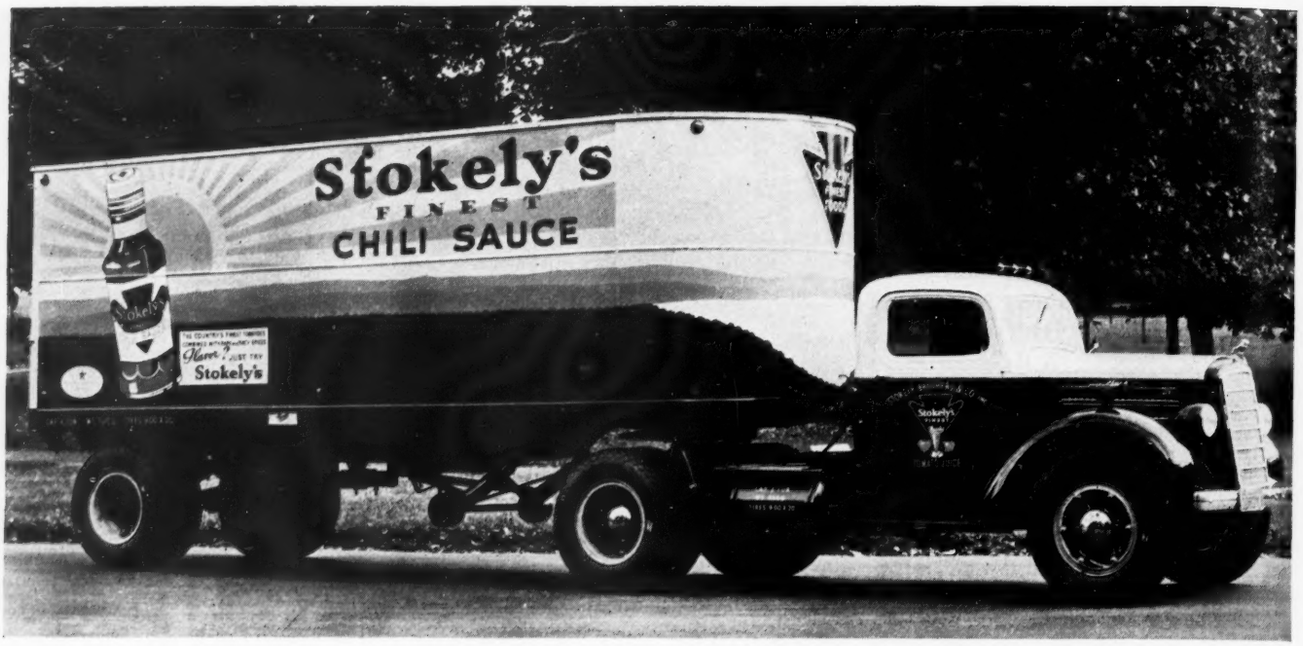
New York City has found it expedient, if not necessary, to withdraw *A, B, C* grading of milk. The municipality has reversed itself without excessive delay or the necessity of unwinding too much red tape.

If compulsory grade labeling were to result from federal legislation, the number of products requiring grade designations on labels would be legion. The probability that there would be need arising for the changing of standards would be multiplied. Changing a federal standard would not be as simple as changing a municipal grading system. Advocates of grade labeling take note.

No Games in 1940

In 1938, one of the backfields, on a surprise play from a new formation, carried the ball the length of the field for a touchdown. The supermarket's "National Brand Week" caught opponents and team-mates off guard. In 1939, team play, coached by AGMA, was the order of the day. Everybody got a chance to carry the ball, and the Parade of Progress marched down the field with little apparent opposition. In 1940—game called on account of rain.

One admonition certain to be leveled at food manufacturers whenever one of the women leaders of the consumer movement addresses an audience is the reminder that manufacturers of packaged food must provide easily opened packages if they would retain consumer good will. Rumford Chemical Works, Providence, R. I., recently abandoned a package in use 46 years to satisfy this incessant demand of consumers for an easily opened package. The new Rumford baking powder can has a lithographed body replacing a paper label, a drum-head inner seal and an easily opened bayonet type screw top with a knurled edge on the outside to furnish a good gripping surface for the housewife with wet or greasy fingers.



Reflected in the brilliant rays of a rising sun, the huge bottle of Stokely's chili sauce pictured on the trailer above is set upon a vividly colored background of farm land, mountains and a lake. The background extends in one unbroken panorama from the rear of the body on one side, around the nose of the trailer, and to the rear on the other side. The tractor is a Mack, running mostly between New York City and Trenton, N. J., but occasionally going as far west as Harrisburg, Pa. The vehicle attracts unusual attention wherever it runs. Distributors like their goods delivered in this type of truck.

Panorama-Painted Trucks Increase Food Sales

High attention value of scenic bodies boosts business. Cost is only $65 a year

PANORAMA-PAINTED TRUCK BODIES, used for their high advertising value, represent a definite trend in the food field. Among the most recent and noteworthy examples of this method of body painting are the vehicles of Stokely Brothers & Co., Inc., Indianapolis, Ind. All of Stokely's closed truck bodies are panorama painted.

While the advertising value of the bodies of a large truck fleet is generally recognized, the methods employed to utilize this value to the greatest extent are varied and many. For a company like Stokely Brothers, with many items in its food line, the possible methods may be summarized as follows: (1) To simply paint the name and address of the owner on the body with other identification marks. (2) To feature on the body some trade-mark to represent all the items in the food line, with the name and address secondary and subordinated. (3) To reproduce, either by decalcomanias or by hand paintings, facsimiles of several of the company's items on each truck body. (4) To paint large, bold and conspicuously only one item in the company's line, supported, surrounded or supplemented by some additional embellishment closely associated with the one item displayed.

In the opinion of Stokely Brothers, method (1) was too drab, too commonplace and of insufficient advertising value. Method (2) did not seem to have sufficient advertising punch and did not indicate the many items in the line. Method (3) was unsatisfactory because it spread the interest too much and gave a body of spotty appearance, leaving method (4) as the most desirable means of getting the greatest advertising value.

As shown in the accompanying views, each Stokely truck or trailer body advertises a different product or item in its line, together with a panorama background associated with the item featured. For example, when the item featured is a large bottle of chili sauce or catchup, the background is a field of tomato plants, showing ripe tomatoes. In the case of grapefruit, a large can of grapefruit is flanked by a panorama background showing a citrus grove with ripening fruit. In the case of pork and beans, the background is a lake and boat with a fishing party preparing baked beans, and of course, a large can advertising the product. In the case of chili con carne, the panorama background is a Mexican desert, a Mexican with his big hat, and a can of chili con carne with its attractive label.

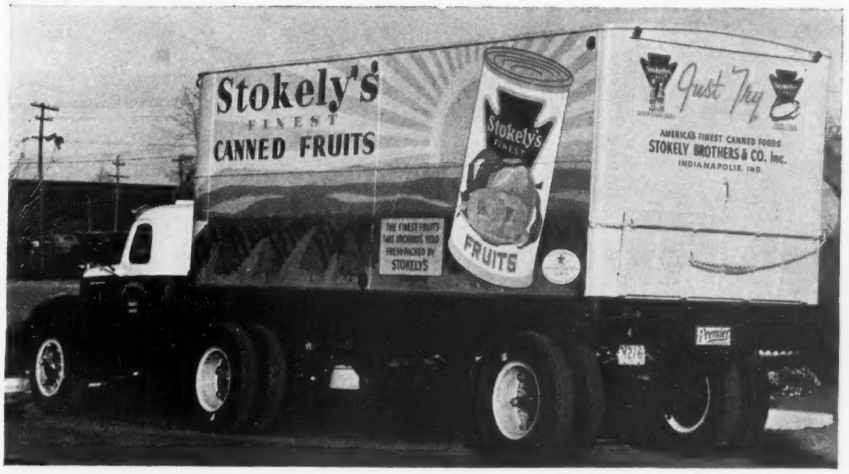
As to the value of this form of panorama painting, the Stokely company has received many compliments. More important, it has received many

requests from its distributors that their goods be delivered in the panorama-painted trucks because of the community advertising value which helps to sell the line. These reactions have made the company feel certain that the art work attracts much more than casual observation—the true test of advertising value.

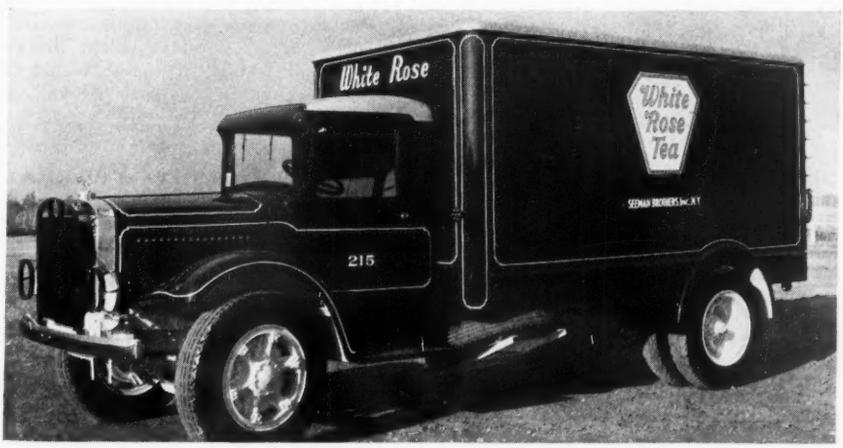
The cost of the panorama painting over and above the cost of painting the Stokely name and other identification marks on the body is charged to advertising and not to motor vehicle expense. The basic painting of the bodies is included in the initial truck costs and is depreciated in the usual manner, but the art work and subsequent repainting for attractive appearance is charged to advertising.

As to the cost of such advertising in dollars and cents, the average cost of painting the Stokely name and other marks of identification on the trailer bodies such as shown in the accompanying illustrations is $15 each. This, with the panorama art work such as shown herewith, totals $80 per trailer. In other words, the net cost of the art work chargeable to advertising is $65 per unit.

To keep the trucks particularly attractive in order to realize their fullest advertising value, they are repainted every two years. This includes the painting of the entire unit of tractor and trailer, including the panorama hand painting. Thus over a three-year period, the art work charged to advertising amounts to $195, or an average of $65 per year.

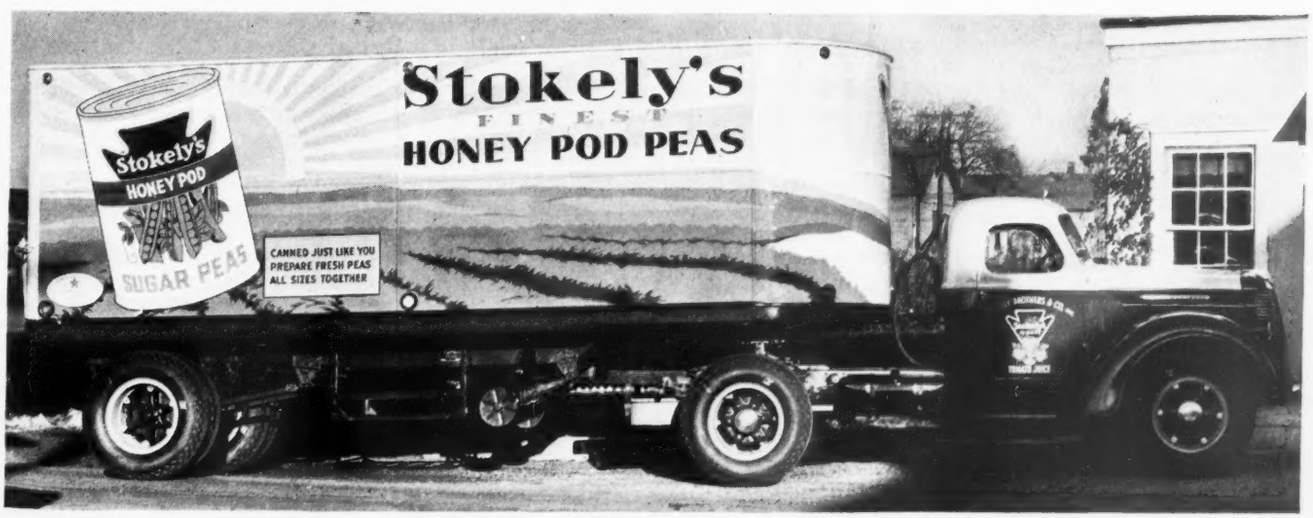


Still another Stokely panorama-painted trailer, featuring canned fruits. Note the recurring rising sun, the mountains and, in the foreground, the orchard. Note also the treatment of the trailer rear end.



JUST IN CONTRAST

Advertising one item in a famous line of food products is done in this case by a white decalcomania keystone trademark with red lettering edged in gold, all on a body background of navy blue. The wheels and chassis are yellow. "Seeman Brothers, Inc., N. Y.," is also a decalcomania. The layout is considered most effective since it can be read easily and quickly while the truck is in motion. It is featured by its simplicity and years of continuity, dating back to the time when easily repainted removable side panels were fastened on the covered rack bodies of the Seeman Brothers horse wagons.



Another of the Stokely one-item, panorama-painted trailer bodies, this one illustrating sugar peas. The art work costs $65 per trailer. It is charged to advertising and not to regular motor vehicle expense.

The Food Industry News

NEW OFFICERS OF BAKERY ENGINEERS

They are, left to right, George T. Carlin, Swift & Co., Chicago, second vice-president; Cecil C. Cadwell, Awrey Bakeries, Detroit, first vice-president; Walter T. Molloy, Fluhrer Bakeries, Eureka, Calif., president; and Victor E. Marx, "Bakers' Helper," *Chicago, secretary-treasurer. Mr. Marx was re-elected.*

Bakery Engineers Hear Problems Discussed; Convention Sets Record Attendance of 1,214

Palatability is the deciding factor in the choice of bread for home consumption. That is what members of American Society of Bakery Engineers were told at their seventeenth annual convention in Chicago, March 11-14, a convention which set a new registration record of 1,214.

The conclusion in regard to palatability was based upon survey results as well as personal observations and conversations with bread buyers. It was part of the bread consumption committee report, and was transmitted to the bakery engineers by Basil Cimaglio, Central Wholesale Grocers Bakery, Chicago. Mr. Cimaglio recommended better contact and more frequent interchange of ideas between the bakery merchandising manager and the bread buying public.

Discussing the value of vitamins, Dr. C. A. Elvehjem, University of Wisconsin, said, in part: "There is no reason why bread should be a complete food. . . .

"However, we have relied upon cereals as an important source of vitamin B_1 and certain other members of the B complex. . . . As you know, a very large part of the original vitamin B_1 in wheat is lost during the milling process. Less than 10 per cent of the original vitamin appears in the best grades of white flour. This distribution has recently been studied by Schultz, Atkin and Frey (*Cereal Chemistry* **16**, 643, 1939).

"Any attempt to increase the vitamin B_1 content of bread should be welcomed by anyone interested in nutrition. . . ."

Photographs were shown at the convention of the new plant of Duvernoy & Sons, Inc., New York, which turns out 71 of a total of 74 specialty rolls on a mechanized production basis to make seven deliveries per production day and have fresh rolls at the point of consumption for each meal period. These pictures were shown by Russell Duvernoy.

In the convention's well-balanced program were included many papers of a technical and practical nature. These covered factors affecting the tenderness and texture of bread, as measured by a machine designed by H. J. Hill, Langendorf United Bakeries, Los Angeles; the art of bakeshop practice and the science and engineering of bakery production; the effect on the baking properties of flour of wheat varieties and milling methods; production costs; performance of equipment; safety; employee relations; influence of packaging upon quality; pan sizes and shapes; pan washing and greasing; and effect of acidity and alkalinity of doughs upon crumb texture.

Canada to Grow More Meat

Further blocking of United States pork products from the English war orders is evidenced by the latest figures from the Canadian Department of Agriculture on Canadian pork production. The department has estimated that farmers have 35 per cent more sows bred to farrow during the spring season of 1940 than were farrowed in the spring of 1939. The fall pig crop of 1939 was 33 per cent above the fall crop of 1938.

Britain Stops Buying American Canned Fruits

Britain stopped importing canned fruits from this country on March 19. Although United Kingdom orders had been somewhat curtailed since last fall and further decreases were expected, this restriction came as a surprise.

Grapefruit exporters will be among the hardest hit by this action, as will be the apricot, peach and pear industries. However, the net effect of this order would no doubt have been approached automatically, because of the exchange control and food rationing plan of the belligerents and because of the large stocks of these commodities stated to be on hand in Great Britain. More serious is the possibility that the effect of this trade interruption may last beyond the war.

Denmark Requires Permits

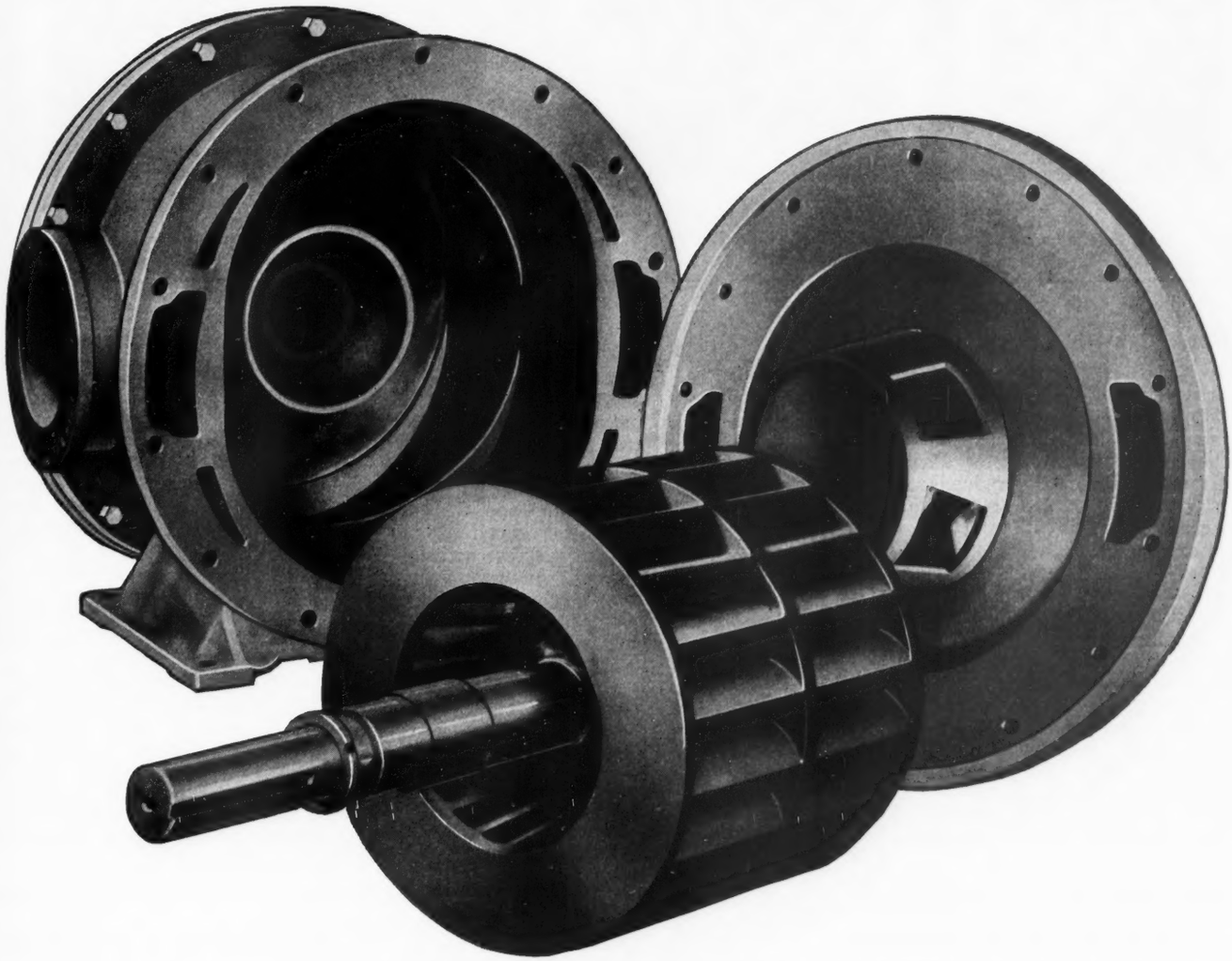
Practically all remaining unrestricted products, except a few considered of limited importance, such as magazines, ships and fish, were made subject to import permit by the Danish government, effective March 1. Sugar and extracts are among the products placed under the restriction. Grain and feedstuffs are still exempt, but remain subject to the special import requirements of the Government Grain Office.

Britain Buys U. S. Ration

Britain is buying from an Indianapolis food company supplies of the Class *C* emergency ration developed by the U. S. Army, according to an unofficial report. This ration is composed of two parts, one made of meats and vegetables and the other consisting of crackers, soluble coffee and sugar. Designed for a possible three-day emergency during fighting, the ration is packed in twin tins, each with a key opener.

The meat and vegetable part of the ration has in the past been prepared for the U. S. Army by Stokely Brothers & Co., Indianapolis. Representatives of the Allies visited that company recently, so it is possible that the British order is being filled by it. The cracker, coffee and sugar part of the ration has in the past been prepared by Miller Cracker Co., Terre Haute, Ind.

Only *Nash Vacuum Pumps* have all of these advantages



Nash Vacuum Pumps are simple, having but one moving part. These pumps have unusual characteristics. They will handle a gas and a liquid simultaneously. Slugs of liquid entering a Nash Vacuum Pump do no harm. Thousands are rendering service where this condition is present.

A unique feature of Nash Vacuum Pumps is that, in handling hot and saturated vapors, they have a condensing effect . . . The operating principle involves an internal liquid seal, which condenses and contracts hot vapors and gases . . . Unless the amount of hot vapor is great, other condensing devices are not necessary.

This liquid seal may be varied with the gas being pumped. On solvent work the percentage of recovery may be increased by using a suitable liquid as the pump seal and recirculating this liquid. Because of the complete lack of internal lubrication, the solvent cannot become contaminated.

Nash Vacuum Pumps are furnished in a wide range of capacities up to 5,000 cubic feet per minute. In single stage design they efficiently maintain vacuums up to 27 inches of mercury, and in two stage design vacuums above 29 inches.

THE NASH ENGINEERING COMPANY

226-A WILSON ROAD • SOUTH NORWALK, CONNECTICUT • U. S. A.

PICKLE AND KRAUT PACKERS AT SCHOOL

Plant managers, technologists and field men attended the Technical School for Pickle and Kraut Packers at Michigan State College, February 20–22. Attendance totaled 105, from seventeen states and Ontario, Canada.

Pickle and Kraut Packers Attend Technical School

Initiated several years ago as a Michigan State College extension service, the Technical School for Pickle and Kraut Packers has gradually reached national prominence. The session held February 20–22, at East Lansing, Mich., was attended by 105 registrants from seventeen states and Ontario, Canada. Packers from points as distant as Georgia, Maine, Connecticut and Colorado were present to establish new boundaries to which the influence of this school has reached.

Arranged to acquaint plant managers, technologists and field men with the most recent developments in the industry, the program dealt with the growing, salting and processing of cucumbers and cabbage to increase yields, cut costs and improve quality.

Ask Change in Standard For Canned Tomatoes

To permit the addition of small amounts of calcium chloride or other calcium salt, amendment of the standard of identity for canned tomatoes has been requested of the Secretary of Agriculture. The application for the change, filed on February 28, was made by the industry because the addition of calcium improves the quality of the canned tomatoes, making the product more firm. Some canners may wish to experiment with this new technological method during the 1940 packing season, the application for the change states. And a portion of the industry may decide to utilize the technic in its 1940 operations.

Revises Smoke Salt Rule

Modification of the cease and desist order which the Federal Trade Commission issued against Morton Salt Co., Chicago, last October (FOOD INDUSTRIES, November, 1939, page 715) was announced on March 8. The manufacturer may use the terms "wood smoke" and "refined condensed smoke" in enumerating or stating the ingredients of this smoked salt "when such salt has been directly subjected to the action and effect of burning wood during the process of combustion and there has been added thereto a refined concentrate resulting from the destructive distillation of wood, and where the application of each of such products is in sufficient quantity to impart to such salt the flavor of the smoke."

Sardine Trade Rules Promulgated by FTC

Trade practice rules for the sardine industry were promulgated on March 5 by the Federal Trade Commission. Published in the *Federal Register* of that date, the rules are intended to remove unfair trade practices from the industry. They cover the following:

Definitions—improper packing, natural style, seconds; sardines unfit for use; misuse of words "natural style," etc.; misrepresenting "seconds," etc.; misrepresentation of industry products; deceptive depictions; imitation of trademarks, trade names, etc.; use of slack-filled or short-weight containers; defamation of competitors or disparagement of their products; substituting inferior products for those ordered; misuse of word "free"; fictitious prices; false invoices; inducing breach of contract; commercial bribery; enticing away employees of competitors; unfair threats of infringement suits; consignment distribution; selling below cost; and discriminatory prices, rebates or unearned brokerage.

This brings to six the number of food industries operating under trade practice rules, the others being the preserve manufacturers, the macaroni and related products industry, tomato paste canners, margarine manufacturers and the wine industry.

Salmon Canners Organize For Collective Bargaining

Salmon packers on the Pacific Coast have organized for the purpose of collective bargaining with the labor unions. They have formed Alaska Salmon Industry, Inc., with Henry Van Hoevenberg as manager. Mr. Hoevenberg formerly was assistant to the president of the Association of San Francisco Distributors. About 90 per cent of the total Alaskan salmon production is represented by the packers participating in ASI.

Unions in the salmon industry have presented a more or less united front to employers ever since 1934, and they have raised the average wage in the industry by 120 per cent.

It is the objective of the new canners' organization to devise a long-term program to avoid labor disputes;

SCHEDULE OF EVENTS

April

9–10—Midwest Power Conference, sponsored by Armour Institute of Technology, Palmer House, Chicago.
9–11—Pacific Northwest Bakers Conference, Multnomah Hotel, Portland, Ore.
11–12—Tri-State Packers Association, Lord Baltimore Hotel, Baltimore.
12–21—Educational Foods Exposition, International Amphitheatre, Chicago.
14–17—Southern Bakers Association, Edgewater Gulf Hotel, Biloxi, Miss.
22–23—Bakery Sales Association, Drake Hotel, Chicago.

May

5 (week of)—Associated Retail Bakers of America, Jefferson Hotel, St. Louis.
8–10—Millers National Federation, Edgewater Beach Hotel, Chicago.
12–18—National Carbonated Beverage Week.
13–14—National Cottonseed Products Association, Roosevelt Hotel, New Orleans.
16–17—Central Atlantic States Association of Dairy, Food and Drug Officials, Hotel Raleigh, Washington, D. C.
20–24—American Association of Cereal Chemists, Park Central Hotel, New York.
22–25—National Confectioners Association, convention and exposition, Palmer House, Chicago.

represent members as a unit in negotiating and executing contracts; see that the contracts are kept by all parties concerned; set up permanent machinery for making and interpreting contracts and settling disputes; and compile factual data on the industry.

Standards Established For Canned Vegetables

Definitions and standards of identity for canned vegetables were promulgated by the Department of Agriculture, under the Federal Food, Drug and Cosmetic Act, in the February 28 issue of the *Federal Register;* typographical errors were corrected in the March 7 *Federal Register.* The regulations, which become effective on May 28, 1940, pertain to the following canned vegetables:

Artichokes
Asparagus
Bean sprouts
Green beans, green stringless beans or stringless green beans
Wax beans or stringless wax beans
Shelled beans
Lima beans or butter beans
Beets
Beet greens
Broccoli
Brussels sprouts
Cabbage
Carrots
Cauliflower
Celery
Collards
White sweet corn, white corn or white sugar corn
Yellow sweet corn, yellow corn or yellow sugar corn, or golden corn, golden sugar corn, or golden sweet corn
Field corn
Dandelion greens
Kale
Mushrooms
Mustard greens
Okra
Onions
Parsnips
Black-eye peas or black-eyed peas
Field peas
Green sweet peppers
Red sweet peppers
Pimientos or pimentos
Potatoes
Sweet potatoes
Rutabagas
Salsify
Spinach
Swiss chard
Truffles
Turnip greens
Turnips

Standards of identity, quality and fill of container for canned peas were issued by Secretary Wallace on February 23 and become effective on May 23. They were published in the February 24 issue of the *Federal Register.*

Students Form Food Technology Association

For benefit of budding food technologists who some day will direct the technological destinies of the industry, a new organization, Associated Food Technologists, has been formed at the University of Washington, Seattle. Certain advance students in the university's new food technology course are members, as are also certain faculty members and a few students in allied sciences. Dedicated in part to broadening the knowledge in food sciences, the AFT was launched on February 28. Ray Lewis is president.

Virginia Packers Get Wage-Hour Exemption

Seasonal exemption from the maximum hour provisions of the Fair Labor Standards Act has been granted the Virginia-Smithfield Meat Packers Association. This was announced on February 29 by the Wage and Hour Division of the Department of Labor. The exemption permits employees engaged in securing and packing Virginia-Smithfield hams to work up to twelve hours a day and 56 hours a week, without overtime payment, for a period of not more than fourteen workweeks a year. Virginia-Smithfield hams are produced from peanut-fed hogs in certain limited areas in Virginia. The hogs are available only from November to March.

Canner Exemption Unlikely

Passage of the Barden-Miller Bill providing for broad exemption of the canning industry from the provisions of the Wage-Hour law becomes increasingly doubtful as the Congressional session moves toward adjournment.

Vitamin Standards, Maybe

Establishment of standards for vitamins is under consideration by the Food and Drug Administration. This is the result of the great emphasis being given to the vitamin content of modern foods.

Answers to Food Law Questions

Interpretative Opinions from F&DA Letters to the Industry

Interpretative opinions of importance and interest to all food manufacturers have been expressed in the correspondence of the Food and Drug Administration. These expressions, summarized below, are unofficial and non-binding, but they show the trend of official policy which should guide industry under the Federal Food, Drug and Cosmetic Act of 1938. In many instances the opinion will apply as well to another commodity as to the one that inspired the question. Some of these opinions have already been discussed in FOOD INDUSTRIES, but many are new.

(FOOD INDUSTRIES will continue this reporting service for its readers for the next few months.—The Editors.)

1. *Labels* on packaged *individual cheeses* must state net weight, manufacturer or packer or distributor, and common or usual name of product.

2. *Corn meal millers* should use only clean,

Schedule of Current Action on Food Standards

(Dockets 1, 2, 3, 4, 5 and 9 have been completed and dropped from this table*)

	Docket number and commodity	Type of standard or regulations	Presiding officer	A First announced in Fed. Register	B Initial hearing date	C Preliminary briefs due not later than	D Examiner's findings published in Fed. Register	E Secretary's order published in Fed. Register	F Effective date of order
6	Canned peas	Identity, quality, fill	J. M. Fox	Mar. 7, '39	April 17, '39	June 29, '39[1]	Nov. 9, '39[2]	Feb. 24, '40	May 23, '40
7-A	Cream			Mar. 28, '39	May 1, '39	July 27, '39[1]	Sept. 26, '39	.....	.....
7-B	Whipping cream			Mar. 28, '39	May 1, '39	July 27, '39[1]	Sept. 26, '39	.....	.....
7-C	Evaporated milk	Identity	F. S. Hassell	Mar. 28, '39	May 1, '39	July 27, '39[1]	.....	.....	.....
7-D	Sweetened condensed milk			Mar. 28, '39	May 1, '39	July 27, '39[1]	.....	.....	.....
7-E	Dried skim milk			Mar. 28, '39	May 1, '39	July 27, '39[1]	.....	.....	.....
8	Canned vegetables	Identity	F. S. Hassell	Mar. 24, '39	April 24, '39	June 19, '39[1]	Aug. 15, '39	Feb. 28, '40[4]	May 27, '40
10-A	Fruit jams	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39	Jan. 5, '40[1]	.....	.....	.....
10-B	Fruit jellies	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39	Jan. 5, '40[1]	.....	.....	.....
10-C	Fruit butters	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39	Jan. 5, '40[1]	.....	.....	.....
11-A	Cheddar cheese			Aug. 22, '39	Sept. 25, '39	Dec. 22, '39[1]	.....	.....	.....
11-B	Washed curd cheese	Identity	W. G. Green, Jr.	Aug. 22, '39	Sept. 25, '39	Dec. 22, '39[1]	.....	.....	.....
11-C	Colby cheese			Aug. 22, '39	Sept. 25, '39	Dec. 22, '39[1]	.....	.....	.....
12	Cream cheese	Identity	W. G. Green, Jr.	Aug. 22, '39	Oct. 2, '39	Feb. 5, '40[1]	.....	.....	.....
13	Coal-tar colors[3]	Listing and certification	F. S. Hassell	Oct. 20, '39	Nov. 20, '39	Dec. 22, '39[1]	Feb. 6, '40	.....	.....
14	Coal-tar colors[3]	Listing and certification	F. S. Hassell	Feb. 6, '40	Mar. 11, '40	.....	.....	.....	.....

[1] Time extended from earlier date previously announced.

[2] Amending order of Docket 4.

[3] Standard of identity only, standards of quality and fill of container published in *Federal Register*, Nov. 25, '39.

[4] Typographical errors corrected in *Federal Register* on March 7.

* Docket 1 pertains to tomato products, 2 to canned tomatoes, 3 to eggs and egg products, 4 and 9 to coal-tar colors and 5 to canned peaches, apricots, pears and cherries. See FOOD INDUSTRIES, October, 1939, page 569; January, 1940, page 70; and February, 1940, page 73, for data on these standards.

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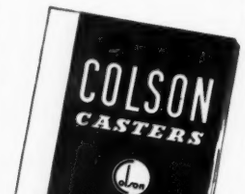

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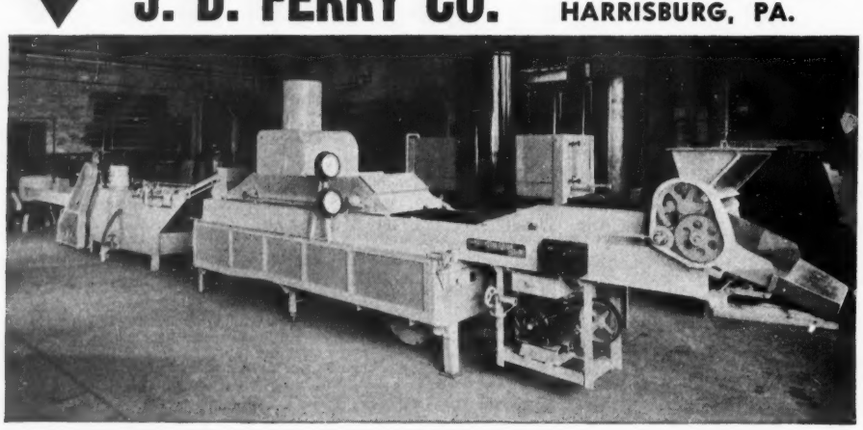

sound corn; should reject unfit lots; should insure against contamination while in process; and should encourage education of corn suppliers to similar precautions.

3. *Dextrose* (refined corn sugar) and *sucrose* are optional ingredients not requiring label declaration on foods for which standards have been established. (See F. I., November, 1939, pp., 482, 514, 515).

4. Label declaration of *eggs* as a *bakery product ingredient* need say only "eggs", whether the eggs used were frozen, dried, or liquid. (See F.I., March, 1940, p. 79).

5. The Administration advises against use of *mineral oil* coating on *apples* to retard decay and evaporation.

6. Imports of *agar-agar* in *bulk* form need not comply with label requirements of Sections 403(e) or 502(b), until further notice.

7. The use of *agar-agar* in candy is permissible, provided that it does not depreciate the value of the *candy* and that labeling provisions are met.

8. The use of *charcoal* in confectionery is permissible provided that it does not adulterate the *confectionery* and that the labeling provisions are met.

9. The phrase "Contents 2 ounces" is ambiguous: *Labels* should state "Net weight 2 ounces" or "Contents 2 fluid ounces." The phrase "Contents 2 ounces avoirdupois" would be misleading if the abbreviation "av" is used, because it might be read to mean "average."

10. A *contaner* of 15 ml. capacity, even though *graduated* at 10 and 15 ml., and labeled to declare the actual contents, would be deceptive if only 2/3 filled.

11. Label statement of *net weight* of contents may include *packing medium* if it is edible and usually eaten by the consumer, referring to Swedish anchovies, sprats and herring tidbits in spiced sauce.

12. *Trade* or *brand names* are not common or usual names, though label reference to them is permissible if it does not mislead the consumer.

13. *Citric acid,* added to canned *artichokes* to permit processing at lower temperatures than possible without added acid, must be declared on the label but need not be described as a *preservative.*

14. Translation of Italian names of alimentary pastes such as spaghetti, vermicelli, pastina, etc., is not practical; *foreign language* may in this case be used on the labels which are otherwise all in English.

15. *"Antipasto"* has acquired the status of a common or usual name, but the ingredients must be declared. Labels, even though small, must be modified to permit this listing, removing other display matter if necessary.

16. *"Huckleberry"* is understood to be synonymous with *"Blueberry"* in labeling this latter commodity for consumption in certain sections of the country.

17. *Gum benzoin* should be declared when it is not a normal constituent of a food mixture.

18. The term *"barley sugar"* should not be applied to a commodity not prepared at least in part from barley.

19. *Bulk shipments* of *chicory* of nonuniform sack size need not bear net weight statement.

20. *Salt anchovies* from which the salt has been washed prior to packing in oil need not declare salt as an ingredient.

21. *Postponement* regulation does not apply to *cartons* and lithographed *labels* if manufacturing process was not completed before February 1, 1939. Delivery of the labels may have been after this date. (See F.I., December, 1939, pp. 402, 404, 462, and January, 1940, p. 66.)

22. *Arsenic* and *lead* cannot be tolerated in any quantity in *citric acid* and *citrates* intended for food purposes, because they

can be avoided by good manufacturing practice, and they are not required in the production of those food constituents.

23. *"Goose-liver Paste"* should not be labeled *"Pate de Foie Gras"* unless prepared from forcibly fed geese. If an *animal fat* is added to the product, it may be subject to control by the Bureau of Animal Industry under the Federal Meat Inspection Act.

24. The use of "powdered ammonia" in making *candy* need not be declared unless some harmless residual ammonium compound is left in the finished product. If the residue may be injurious, the product would be adulterated.

25. *Chemicals* may be used in foods if they are not harmful to the consumer and if they do not conceal any inferiority in the food, and if any deviation from standard or expected identity of the food be adequately declared on the label.

26. Artificially colored glacial *acetic acid* is not distilled *vinegar*. The use of edible grade acetic acid in a food product must be declared on the label. It is unnecessary to declare the source of *alcohol* used in the manufacture of distilled vinegar.

Stamp Plan Extended; Funds Are Reconsidered

More thorough coverage of the country by food stamp operation has been brought about by recent extension of the plan to counties in New Hampshire, Washington, North and South Carolina, Montana, Mississippi, Kentucky, Kansas, Illinois, Pennsylvania and New Jersey.

Operation of the plan began in Pittsburgh on March 18, and is scheduled for early April in Newark, N. J. Other large cities trying the plan are Los Angeles, San Francisco and Cincinnati. There are now approximately 50 cities in all which have food stamps in circulation.

Last month the Senate voted a $300,000,000 increase in the agricultural supply bill over the amount approved by the House. Included in the increase was $212,000,000 for parity payments, the first item to be acted upon and approved by the Senate, and $85,000,000 for the surplus removal and food stamp program. It is thought likely that, except for a possible slight paring by the House, these increases will be passed by Congress.

Tea Standards Announced

Tea standards for the year beginning May 1, 1940, were announced by the Department of Agriculture on March 2. Secretary Wallace approved selection of standard teas of the following ten types:

Formosa oolong
Formosa black
Congou
Java (to be used for all fully fermented teas excepting China, Japan and Formosa)
Japan black
Japan green
Japan dust
Gunpowder to be used for all China green teas)
Scented Canton (to be used for all scented teas)
Canton oolong

These standard teas were submitted to the Secretary by a board of tea experts, which selected the standard samples on February 5 (FOOD INDUSTRIES, March, 1940, page 79). They represent types suitable for comparison with all the various kinds imported. The standard samples, put up in ½-lb. tins, will be available for distribution within a few weeks. They are furnished at cost by the Department of Agriculture to importers and shippers of tea in this country.

Food Law Guaranty Approved by AGMA

Simple and legally adequate food law compliance guaranty forms have been approved by Associated Grocery Manufacturers of America for use by the industry. The forms, one an invoice guaranty and the other an individual guaranty, follow:

"Invoice Guaranty: 'The Jones Co. guarantees that no article listed herein is, when shipped or delivered by it, adulterated or misbranded within the meaning of the Federal Food, Drug and Cosmetic Act, or any practically similar State law, or one which may not, under that act or law, be introduced into interstate or intrastate commerce.' Then follows the (facsmile) signature and post-office address of the guarantor.

"Individual Guaranty: 'The Jones Co. guarantees that no article hereafter shipped or delivered by it to (insert name and post-office address of dealer) is when

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These forms were approved by AGMA on March 5.

Water Problems Discussed By Food Technologists

Water problems in food processing was the feature subject at the fourth meeting of Chicago Association of Food Technologists on March 1. In a symposium type of program, "Microbiology of Water Affecting Flavor and Keeping Quality of Dairy Products" was the subject of a paper by M. E. Parker, production manager of Beatrice Creamery Co. "Chemistry of Water Affecting the Flavor and Character of of the 1938 record crop.

Construction News

	Pending (thousands)	Awarded March (thousands)	Total Awarded 1940 (thousands)
Bakery	.....	$40	$180
Beverages	$380	282	1,599
Canning and Preserving	400	.....	.....
Cold Storage Plants	.....	161	201
Confectionery	50	75	75
Grain Mill Products	795	40	165
Ice Manufactured	40	.....	80
Meats and Meat Products	225	292	292
Milk Products	595	.....	724
Miscellaneous	880	840	2,105
	$3,365	$1,730	$5,421

feld, plant manager of Pabst Brewing Co. Engineering methods for correcting water problems in carbonated beverages and food processing were outlined and explained by F. J. Lammars, production engineer, International Filter Co.

Victor Conquest, director of research for Armour & Co., was elected treasurer of the association.

Union Must Pay Damages

Damages must be paid by Milk Wagon Drivers Union to Sheffield Farms Co., New York, because of a one-day strike at the close of February which deprived 500,000 consumers in parts of New York City of their daily milk supply. The decision in respect to the damages was made by Arthur S. Meyer, impartial chairman of the milk industry in the metropolitan area. The amount of the damages was not stipulated but will be fixed at a hearing.

Mr. Meyer found the union guilty of calling a strike in violation of the non-strike agreement between the company and the union. The strike was called because three platform men who were discharged had been required to stack cases containing the new two quart containers of milk to a height which they considered injurious to health. Mr. Meyer's decision pointed out that piling the cases constituted a "hardship" rather than "jeopardy to life or health."

Milk Consumption Up

According to the United States Department of Agriculture, total consumption of dairy products in 1939 established a new high figure of 842 lb. per capita (milk equivalent), the highest in the sixteen years of record. This was 5 per cent above the former record, made in 1938, of 808 lb. per capita, Consumption of manufactured dairy products stood at 497 lb. per capita in 1939, compared to 477 lb. per capita in 1938.

Commodity Prices Lower

Perhaps because of the coincidence of the Finnish-Russian peace and the coming of Spring, food commodity prices were somewhat lower in mid-March than in mid-February. The *New York Journal of Commerce* com-

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modity price index for foods, which stood at 69.1 on February 17, had fallen to 64.9 on March 16. The same publication's index for grain prices was 75.7 on the earlier date and 74.2 on March 16. The general commodity index of the same publication, for the four-weeks period, fell from 80.8 to 79.6.

Among individual commodities, decreases in flour from $6.20 to $5.75, lard from $6.85 to $5.90 and eggs from 27¼c. to 17¾c. were the most notable price declines. Other food commodity prices showed little movement during the four-week period.

Sugar Stock to Rise

World sugar production in the crop year ending Aug. 31, 1940, is forecast by Lamborn & Co. at 30,753,000 long tons, raw sugar equivalent. This would be 4.3 per cent over the production for the previous year and within 214,000 tons of the 1938 record crop.

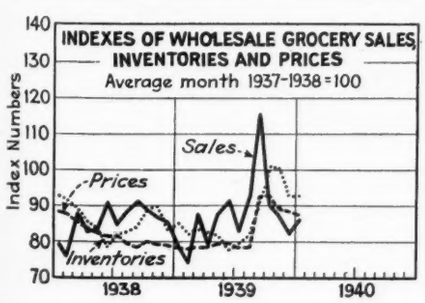
Consumption for the 1940 crop year is forecast at 29,551,000 tons, including an allowance for losses caused by ship sinkings. The difference between production and consumption, a total of 1,202,000 tons, would be added to the stocks of 10,269,000 tons, existing on Sept. 1, 1939, making the stocks on Sept. 1, 1940, total 11,471,000 tons.

More Livestock Killed

According to figures of the Agricultural Marketing Service, Federally inspected slaughter of livestock showed increases in February, 1940. The number of cattle slaughtered was 715,118 compared to 652,567 a year before. Slaughter of hogs was the largest for February since 1932, and totaled 4,227,-

Data for the Charts

In preparing the curves shown on this and the succeeding page of Food Industries, data were obtained from the following sources: Prices received by farmers, U. S. Department of Agriculture; employment, payrolls, wholesale and retail prices, U. S. Department of Labor; cost of living, National Industrial Conference Board; commodity price index, *N. Y. Journal of Commerce;* business activity index, *Business Week;* data on wholesale grocery sales, inventories and prices are from U. S. Department of Commerce.



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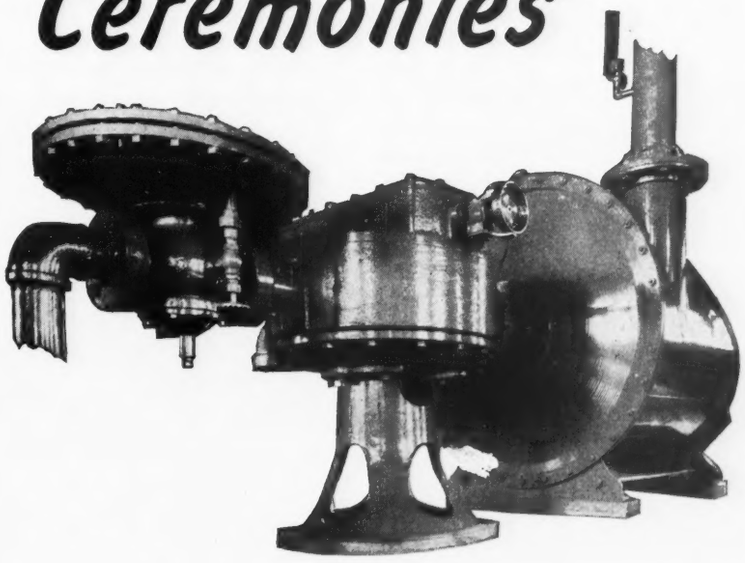

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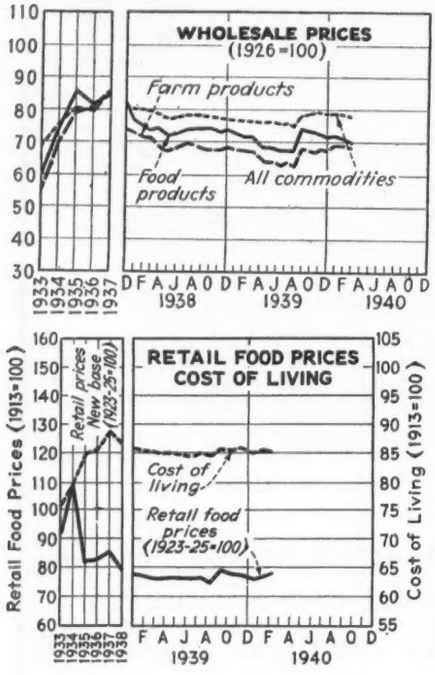
KEMP of BALTIMORE

212, compared to 2,890,428 a year before. In contrast, killings of sheep declined to 1,312,541 from 1,360,964 the year before.

In view of these figures, the report of the same Bureau that prices of livestock and livestock products, as a group, average below previous comparable periods is to be expected.

England Buys Sardines

Sales to England of sardines packed in the United States have jumped, the export figure in January, 1940, being 115,000 cases, compared to only 17,200 cases in January, 1939. As a whole, exports of U. S. sardines for the 1939–1940 season are 56 per cent over exports for the preceding season, with England the principal buyer. As output of canned sardines in California this year is running well ahead of output in the preceding year, there is every prospect that this war demand can be satisfied.



INDICATORS

SALES of confectionery and competitive chocolate products in January, 1940, were $19,007,000 compared to $16,820,000 in January, 1939.

SUGAR DELIVERIES by refiners, beet processors and importers in January and February, 1940, totaled 783,491 short tons, raw value, compared to 700,522 tons delivered in the same months of 1939.

FLOUR PRODUCTION in January, 1940, by mills representing about 64 per cent of total U. S. flour production, amounted to 5,226,345 bbl., according to *The Northwestern Miller*. The corresponding figure for February, 1939, was 5,178,098 bbl.

ACREAGE planted to peas for processing in 1940 is expected to be 27 per cent greater than the 259,450 acres planted in 1939.

COTTONSEED OIL consumption in February, 1940, was 213,350 bbl., compared to 267,306 bbl. in January, 1940, and 221,915 bbl. in February, 1939.

BUTTER, creamery, produced in January, 1940, totaled 126,040,000 lb., 1 per cent below production in January, 1939, but 9 per cent over average production in the years 1930–1938.

CHEESE, American, produced in January, 1940, was 30,440,000 lb., up 5 per cent above the January, 1939, output, and 21 per cent above the average for the month in the years 1930–1938.

OLEOMARGARINE SALES, as indicated by sales of internal revenue stamps, in January, 1940, were 31,861,982 lb., compared to 30,019,440 lb. in January, 1939, an increase of 6 per cent.

ORANGE CROP, 1939–40 season, is now forecast at 70,392,000 boxes, compared to 78,863,000 boxes in the preceding season, the reduction being attributable to the recent freezing weather in Florida and the Southwestern U. S.

GRAPEFRUIT PRODUCTION in the 1939–1940 season is placed at 30,800,000 boxes, off from last year's record crop of 43,714,000 boxes, largely because of severe weather.

FRUITS, frozen, in storage on March 1, 1940, totaled 103,975,000 lb., compared to 103,113,000 lb. a year before, and to an average of 77,712,000 lb. for the date in 1935–1939.

VEGETABLES, frozen, in storage on March 1, 1940, totaled 61,338,000 lb., compared to 55,782,000 lb. a year before.

BUTTER, creamery, in storage on March 1, 1940, was 18,278,000 lb., compared to 92,780,000 lb. one year previous and to a March 1 average of 30,190,000 lb. in 1935–1939.

CHEESE, all kinds, in storage on March 1 of this year amounted to 82,684,000 lb. The figure one year before was 91,485,000 lb. and the 1935–1939 average for the date was 83,993,000 lb.

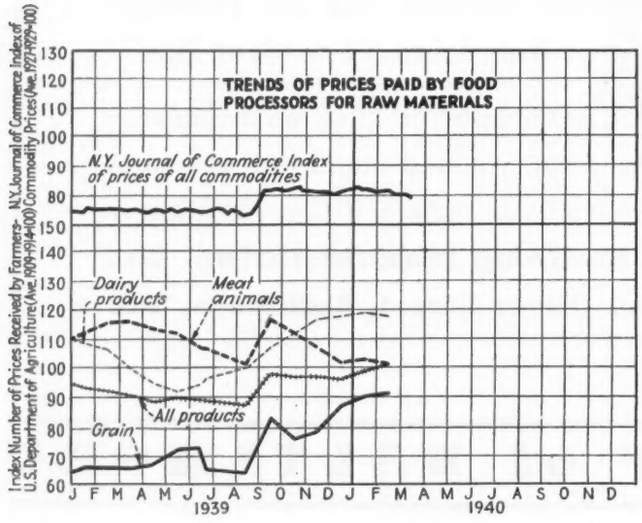
EGGS, case equivalent, in storage on March 1, 1940, totaled 1,152,000 cases, compared to 1,436,000 cases on March 1, 1939, and to 1,611,000 cases average on the date in 1935–1939.

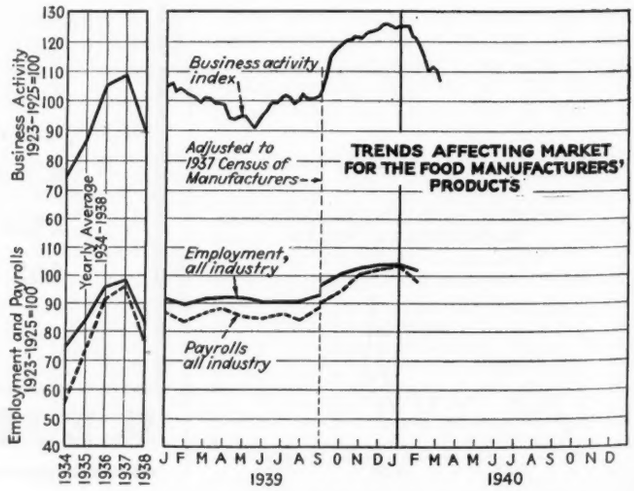
POULTRY, all kinds, in frozen storage on March 1, 1940, totaled 144,743,000 lb., compared to 116,229,000 lb. one year before and to an average of 113,431,000 lb. for the date in 1935–1939.

MEAT, all kinds, in cure and frozen storage on March 1, 1940, totaled 833,622,000 lb., compared to 659,075,000 lb. on March 1, 1939, and to a 1935–1939 average for March 1 of 788,071,000 lb.

LARD in storage on March 1, 1940, was 258,029,000 lb., compared to 125,281,000 lb. one year previous and to a March 1 average of 126,732,000 lb. for the years 1935–1939.

WEEKLY FOOD INDEX of Dun & Bradstreet, Inc., stood at $2.31 on March 12, compared to $2.29 one year before, and to $2.32 for the preceding week.


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
N.Y. Journal of Commerce Index of prices of all commodities
Dairy products
Meat animals
All products
Grain
Index Number of Prices Received by Farmers- N.Y. Journal of Commerce Index of U.S. Department of Agriculture (Ave. 1909-1914=100) Commodity Prices (Ave. 1923-1929=100)
1939
1940



Men, Jobs & Companies

INDUSTRY

Bercut-Richards Packing Co., Sacramento, Calif., is building a new extension and installing modern equipment at an estimated cost of $50,000. Twelve 750-gal. tanks will be installed on the second floor at three different levels for the processing of tomato juices and sauces.

Blanton Co., St. Louis, Mo., will construct a reinforced concrete and brick one- and two-story office and manufacturing plant for oleomargarine at an estimated cost of $400,000.

Harold H. Clapp, Inc., Rochester, N. Y., is planning a $50,000 addition to its plant.

Coca-Cola Co. has won an injunction suit against the manufacturers of Dixi Cola, Marbert Cola, Lola Cola and Apola Cola. The defendants, Dixi Cola Laboratories, Inc., Marbert Products, Inc., and Apola Extract and Syrup Corp., have been enjoined by the United States District Court at Baltimore from using the word "cola" as part of the name of their product and have been ordered, in case they distribute their product in other than bottled form, to change its color so as to distinguish it clearly from Coca-Cola. In another suit in Chicago, Coca-Cola Co. has obtained a permanent injunction restraining a cocktail lounge, Just Kitty Davis, Inc., from passing other products than those of the Coca-Cola Co. in response to calls for Coca-Cola or "cokes".

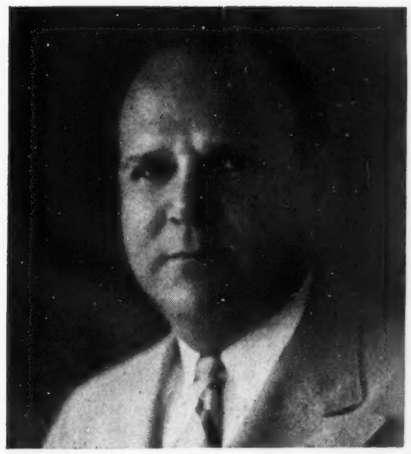
Dairymen's League Cooperative Association, Syracuse, N. Y., will build a $50,000 brick, steel and concrete addition, 100 x 100 ft., to its plant.

General Mills, Inc., has established a General Mills, Inc., Health Association to provide sickness and hospitalization benefits for its 7,300 employes.

Honor Brand Frosted Foods Corp., subsidiary of Stokely Bros. & Co., has moved its executive, accounting and production departments from Indianapolis to Oakland, Calif.

Kroger Grocery & Baking Co. is building a $150,000 addition to its packing plant at Columbus, Ohio, which will double the present capacity of the plant.

Lance Packing Co., Inc., Charlotte, N. C., will spend approximately $125,000 in a building addition that will increase the size of the plant by two-thirds.



Greystone

ALBERT R. FLEISCHMANN

Murray Collens

JOHN W. LUCE

They have been made vice-presidents by Standard Brands, Inc., New York. Mr. Fleischmann has been manager of the Chicago division for the past ten years. He joined the Chicago office of Fleischmann Co. in 1919 and will continue to have headquarters there. Mr. Luce is stationed in New York as manager in charge of the production of all products. He joined Fleischmann Co. in 1915 and has since been identified with the production department.

S. A. Moffett Co. is constructing a large combination processing, freezing and storage plant at Mt. Vernon, Wash., at an approximate cost of $121,000. The cold storage plant will be three stories high and will have a capacity in excess of 50 carloads. The quick freezing capacity will be about 50 tons per day. The company quick freezes fruits and vegetables. The management of the new plant will be under the direction of H. A. Hinrichs, who was formerly manager at the Stanwood plant.

Pepsi-Cola Bottling Co., Cleveland, will build a modernistic bottling plant, with 35,000 sq. ft. of floor space, at a cost of around $100,000. White face brick and glass block will be used on the front.

Pepsi-Cola Co., Long Island City, N. Y., has announced plans for developing the Negro market by appointing Herman T. Smith, Negro newspaperman, to a special sales promotion post. Mr. Smith will go first to Birmingham, Ala., where he will direct a series of promotions throughout the South, after which he has plans for varied types of promotion for Negro communities throughout the entire country.

Pepsi-Cola Co. will erect a modern brick and steel bottling plant, to cost $50,000, at Albany, N. Y.

Schmidt Brewing Co., Detroit, has announced a $310,000 expansion program which will include a new two-story stock house and additions to the present bottling plant. Storage capacity will be increased 75 per cent, while the bottling capacity will be brought up to 600,000 bottles a day.

Spreckles Sugar Co. is planning to erect a plant near Sacramento, Calif., where it has acquired control of approximately 100 acres of land.

Tucker Beverage Co. will build a brick, steel and concrete bottling plant at Pittsburgh, to cost about $50,000 with equipment.

Frank M. Wilson Co., San Francisco, has bought the Stockton, Calif., cannery of Stockton Food Products, Inc., at a reported price of $100,000. About $55,000 has been expended on new equipment.

PERSONNEL

John H. Barton, formerly president of National Oil Products Corp., has been appointed vice-president of Eastern Semolina Mills, Inc., New York.

John Brandt, president of Land O'-Lakes Creameries, Inc., Minneapolis, has been re-elected president of Dairy Products Marketing Association.

John F. Brogan has been appointed director of a new institutional department which has been organized by Standard Brands, Inc., New York, to supervise sales to hotels, restaurants and institutions.

William W. Brown, manager of the Buffalo, N. Y., division of Standard Brands, Inc., New York, has been transferred to a similar position at Cincinnati, Ohio. The Buffalo office is being discontinued as a division although offices will still be maintained in that city.

John Burlinson, a director of Sheffield Farms Co., Inc., New York, has been appointed advertising manager of the company.

Wesley H. Childs has resigned from Beech-Nut Packing Co., Canajoharie, N. Y., to become chief chemist of Industrial Sugars Corp., Chicago.

Sam R. Connelly has been made vice-president and general manager of Chattanooga (Tenn.) Coca-Cola Co. He had been secretary-treasurer for the past 15 years.

E. J. Davidson has succeeded the late Dr. Richard F. Eagle who was in charge of Wilson & Co.'s Middle West produce plants.

Charles P. Gulick, president of Republic Yeast Corp., Newark, N. J., has been elected president of National Oil Products Co., Harrison, N. J. He was one of the founders of the firm and was president until two years ago when he became chairman of the board. He succeeds John H. Barton, resigned.

Ernest C. Guth, member of a family prominently identified with the soft drink, candy and chocolate industries, has organized a beverage bottling concern and has opened a plant in Baltimore. The firm, Ernest C. Guth, Inc., which he will head, has been capitalized at $1,000,000.

O. B. Hayes, formerly of Birmingham, Ala., has been appointed Memphis manager of Grennan Bakeries. He succeeds B. D. Cook who has been promoted to the position of divisional sales manager at Chicago.

E. C. Hoile has resigned as manager of Hawthorne Dairy, Highland Park, Ill., to become general manager of Appleton (Wis.) Pure Milk Co.

Charles E. Kiewel has been elected president of Minneapolis Brewing Co. to succeed Jacob Kunz who has become chairman of the board. Frank B. Kunz was named vice-president.

R. W. Kirn, formerly head of the Engineering Department of the Cedar Rapids, Iowa, plant of Quaker Oats Co., has become plant superintendent.

Max Lehmann, formerly vice-president and general manager of Rocky Mountain Packing Corp., Salt Lake City, has signed a lease on the modern canning plant located on one of the piers of the Port of Astoria terminal. He has organized the Oregon Packing Corp, and is negotiating for the vegetable freezing plant at Warrentown, Ore.

R. B. McLeaish has been named general manager of Rio Grande Valley Citrus Exchange, succeeding John B. Jones, resigned.

Oscar W. Menge, sales manager of Dold-Hygrade Packing Co., has left Buffalo to become general manager of A. Fink & Sons Co., Newark, N. J., a subsidiary of Hygrade Food Products Corp. He was formerly vice-president and general sales manager of Jacob Dold Packing Co. and was instrumental in the merger of the Dold and Hygrade companies.

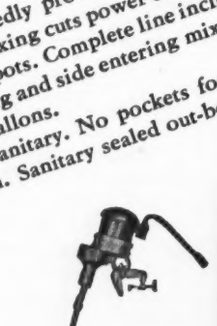
Creighton Morrison, head miller of "B" mill, Washburn-Crosby Co., Buffalo, N. Y., has been named chairman of

Reduce YOUR MIXING COSTS THE SANITARY "LIGHTNIN" WAY

Replace Paddle Type Agitators

It has been repeatedly proved that LIGHTNIN Patented Double Action Propeller Type Mixing cuts power costs, reduces mixing time and entirely eliminates dead-spots. Complete line includes geared and direct drive portables, top entering and side entering mixers for mixing quantities from one to one million gallons. Completely sanitary. No pockets for bacteria. Easily cleaned with hot water or steam. Sanitary sealed out-board bearing prevents oil or grease from this source contaminating mix.

"Lightnin" Variable Speed Mixers operate from 100 to 1800 R. P. M.



"Lightnin" Portable Mixers (geared and direct drive) range in size from 1/30 to 10 H. P.

"Lightnin" Top Entering Units (geared and direct drive) for open or closed tank work including pressure and vacuum work.

"Lightnin" Side Entering Units for tanks up to 1,000,000 gals.

"LIGHTNIN" SAVES MONEY MIXING

Carbonated Beverages
Tomato Products
Fruit Juices—Jellies—Jams
Preserves—Lard—Milk
Ice Cream Mix—Milk Drinks
Buttermilk—Bakery Supplies
Soups—Brines—Syrups
Vinegar—Wines
Yeast Products—Flavorings
Fruit Pulp—Extracts
Vegetable Dyes—Baby Foods
Premixing Mayonnaise and Salad Dressings
Sherbet—Honey
Beer—Distilled Spirits
Meat Sauces—Vegetable Oils
Vegetable Butters
Mincemeat—Cod Liver Oil

MIXING EQUIPMENT CO., INC.
1043 Garson Ave., Rochester, N. Y.
Please send me:
☐ Bulletin B-65—Portable Mixer.
☐ Bulletin B-63—Top Entering Mixer.
☐ Bulletin B-62—Side Entering Mixer.
☐ Mixing Equipment Work Sheet.

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Address_____

MIXING EQUIPMENT CO., INC.
1043 Garson Ave., Rochester, N. Y.

MANUFACTURERS OF LIGHTNIN PROPELLER TYPE MIXERS

District No. 8, Association of Operative Millers.

Ellen Pennell has been appointed director of the consumer relations program of Associated Grocery Manufacturers of America, Inc., New York.

Walter Teipel, Sr., has been named president and general manager of Kurth Malting Co., Milwaukee.

Charles Thom, of the United States Department of Agriculture, Washington, D. C., has been elected president of the Society of American Bacteriologists.

R. S. Twining, managing director of Gordon Head Canning Co., Ltd., Victoria, B. C., has been elected president of Canned Foods Association of British Columbia.

H. P. Warren, manager for the past thirteen years of Minute Tapioca Co., Inc., Orange, Mass., has been named vice-president of the company.

Ralph Wilson, superintendent of the Champaign, Ill., soybean plant of Swift & Co., has been named plant superintendent of the Richmond, Ohio, factory of A. E. Staley Manufacturing Co.

Thad Wiseheart has become the Detroit manager of Carnation Milk Co. He has been district sales manager at Indianapolis for the past fifteen years.

Joseph Wozniak, formerly part owner of Consolidated Foods, Inc., Toledo, Ohio, has purchased Wolverine Potato Chip Co., Detroit. He was recently elected president of the National Potato Chip Institute.

DEATHS

Roy F. Bridgeman, 49, president of Bridgeman Creameries, Inc., Minneapolis, Feb. 28.

Edward J. Costello, 50, vice-president of Midwest Biscuit Co., Burlington, Iowa, Feb. 23. For 23 years he was production manager of Iten Biscuit Co., Omaha.

John F. Felin, Jr., 39, vice-president of John J. Felin & Co., Philadelphia, March 10.

Paul Garrett, 76, who was in the wine making business more than 50 years, March 18, at New York. He was president of Garrett & Co., Brooklyn, N. Y., which was founded 105 years ago in North Carolina by an uncle.

James C. Murray, 67, vice-president and director of Quaker Oats Co., and former president of Chicago Board of Trade, March 2, at Miami Beach, Fla.

Emil Sieloff, 61, president and founder of Sieloff Packing Co., St. Louis, Feb. 22.

ASSOCIATED INDUSTRIES

Crocker-Wheeler Electric Manufacturing Co., Ampere, N. J., has elected Edward S. Perot as president. At one time he was president of Southern Dairies, Inc.

Dry-Zero Corp., Chicago, is now publishing a new bimonthly publication, "Lindsay Structure News," which will discuss the selection, construction and repair of motor truck bodies.

Harry L. Miller, of the Chester (Pa.) Dairy Supply Co., has been elected president of Dairy Industries Supply Association.

National Oil Products Co., Harrison, N. J., has developed a new prepared foam killer for use in yeast manufacture called "Vegifat Y."

Republic Steel Corp. has improved and greatly expanded its stainless steel facilities at Canton and Massillon, Ohio.

DON'T GIVE YOUR SECRETARY THE JITTERS

● When you need sanitary fittings or pumps—any size, any type or metal—contact your nearest TRI-CLOVER supply house. TRI-CLOVER is the COMPLETE line. You get quick, dependable service.

Leading supply houses throughout the nation stock and recommend TRI-CLOVER products. Write for the name of your nearest dealer.

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Just off the Press

BOOKLETS • LITERATURE • BULLETINS

Food Plant Equipment

AIR CONDITIONING—Equipment for cooling and ventilating purposes is covered in 18-page illustrated Bulletin FU-22, by Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo.

CORN-CUTTERS—"Cutting Corn Correctly", a comparative analysis of some of the operating mechanisms and principles of whole kernel corn-cutting machines, has been issued by The United Co., Westminster, Md.

FIBRE GRINDER—The new Fibre grinder, claimed to have twice capacity per horsepower hour in fine grinding of fibrous materials, is described in a recent booklet by Prater Pulverizer Co., 1825 S. 55th Ave., Chicago, Ill.

FLAKING MILL—"Heavy Duty Mills Reduce Flaking Costs!" outlines the process for the manufacture of toasted cereal flakes in 20-page illustrated Bulletin B-6046, of Milling Machinery Division, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

MATERIALS HANDLING — Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill., has recently issued 48-page Bulletin No. 1700, "Link-Belt Conveyors in American Industry", illustrating different applications of mechanical elevating and conveying equipment for handling packages and loose bulk material; and Folder 1804 on bronze drive and conveyor chains for corrosion resistance.

MIXERS AND MILLS—Homo-mixers for mixing without incorporating air and colloidal equipment featuring the colloid mill are described in Bulletins No. 402 and 401, respectively, by Eppenbach, Inc., 45-10 Vernon Blvd., Long Island City, N. Y.

MIXING EQUIPMENT—Form 214-010M, of Reynolds Electric Company, 2650 W. Congress St., Chicago, Ill., announces Model 422, a 4-speed mixer for floor or bench mounting.

RACKER—An illustrated folder published by Schlangen Brewery Equipment Division, American Machine and Metals, Inc., East Moline, Ill., lists 18 advantages of the new racker filling machine for use in the brewing industry.

Plant Accessories and Supplies

ELECTRIC EQUIPMENT—Recent publications of General Electric Co., Schenectady, N. Y., include: GEA-1184D on a.c. magnetic motor-starting switch, CR7006-D30B, for squirrel cage motors or as a primary switch for wound-rotor motors; GEA-3301 covering Reactrol system for controlling electrically heated equipment; and GEA-2915A describing Type KC, $\frac{1}{8}$ to $\frac{3}{4}$ hp, general purpose capacitor motors.

GATE VALVES—Circular No. 504-R1, of The Lunkenheimer Co., P. O. Box 360, Annex Station, Cincinnati, Ohio, shows a complete line of "King-Clip" gate valves with drain channels and bronze thread bushing in bonnet.

HEAT CORROSION—Bulletin P 11, of Metallizing Engineering Co., Inc., 21-07 41st Ave., Long Island City, N. Y., covers metcolizing process and equipment for protection of iron, steel, and in some cases, copper and bronze against oxidation and scaling at high temperatures.

HEAT INSULATIONS—The Philip Carey Co., Cincinnati, Ohio, claims that heat insulations for temperatures from sub-zero to 2500 deg. F. can pay up to 1200 per cent on investments in air-conditioning equipment, corrugated roofing and siding, roof coatings, flooring, etc., in an illustrated bulletin, "Proved Protection Against Wasted Profits."

HOISTS—"Safety-Pull" hoists and other utility maintenance tools form the subject of 20-page illustrated Catalog No. G-1, of Coffing Hoist Co., Danville, Ill.

LEATHER BELT—Alexander Bros., Inc., 406 N. Third St., Philadelphia, Pa., announces its duplex leather link belt designed for slow, heavy pull drives, in illustrated Form A-13.

MOVABLE WALLS—Information on transite, asbestos movable walls for subdividing offices, factories and stores is included in a new 20-page brochure of Johns-Manville, 22 E. 40th St., New York, N. Y.

PIPING MATERIALS—Crane Co., 836 Michigan Ave., Chicago, Ill., has published 54-page illustrated Circular No. 312, entitled "Corrosion-Resistant Valves and Fittings," including color charts, data on properties and behavior of various alloys, and information on sanitary fittings and fabricated piping.

PUMPS—Fairbanks, Morse & Co., Chicago, Ill., has issued Bulletin 5810D devoted to single-stage, split-case centrifugal pumps, giving specifications, dimensions and engineering information with selection tables.

PUMPS & COMPRESSORS — Recent publications of Worthington Pump and Machinery Corp., Harrison, N. J., include: Bulletin H-450-B30 on vacuum molded impellers for turbine well pumps, Bulletin H-450-B29 devoted to water lubricated turbine well pumps, Type QDO, and Bulletin L-600-B10 on Type LTC angle gas-engine compressors, available in six sizes ranging from 375 to 1000 hp.

ROLLER CHAINS—Engineering data on complete line of roller chains are presented in a 24-page illustrated Bulletin R-54, by Morse Chain Co., Ithaca, N. Y.

STEEL EQUIPMENT — The "Shot-weld" process for welding stainless steel is described in detail by Edward G. Budd Manufacturing Co., Philadelphia, Pa., in its recent illustrated bulletin.

SUPERHEATERS—Details on "Elesco Superheaters" for application to different types of boilers are given in 24-page illustrated Catalog No. ES-10, by Combustion Engineering Co., Inc., 200 Madison Ave., New York, N. Y.

VACUUM EJECTOR—Two-stage condensing type steam-jet ejectors for the production of vacuum in industrial processes are described in 5-page Bulletin W-205-B7, by Worthington Pump & Machinery Corp., Harrison, N. J.

Packaging

CORRUGATED BOXES—A new portfolio containing case histories illustrating successful corrugated boxes has been issued by The Hinde & Dauch Paper Co., Sandusky, Ohio.

PACKAGING—"Facts and Figures on Packaging the Triangle Way" containing packaging case studies and performance data has been issued by Triangle Package Machinery Co., 906 N. Spaulding Ave., Chicago, Ill.

PACKAGING MACHINERY—"Streamlining the Existing Plant", reprinted from the January, 1940 issue of Modern Packaging, describes The Bristol-Myers Co. rebuilding program in modernizing its packaging operations and machinery by installing streamlined steel enclosures built by Falstrom Co., Passaic, N. J.

PACKAGING MACHINES—"Jumbo" stencil cutting machine, claimed to cut the largest stencil that can be made with any machine, Stikfast label paster and Kari-All parts assorter are described in three recent folders of Diagraph-Bradley Machine Corp., 3745 Forest Park Blvd., St. Louis, Mo.

WRAPPING MACHINE—Package Machinery Co., Springfield, Mass., announces Model FA-Q wrapping machine in a recent 4-page bulletin giving floor plan and elevation and specification data.

Trucks, Tractors & Accessories

TRUCKS—Dodge Division, Chrysler Corp., Detroit, Mich., has issued a pamphlet on two-speed axles used in Dodge job-rated dual-purpose truck models and a book entitled "Operating Record for Motor Trucks and Passenger Buses."

Control Equipment

CONTROL EQUIPMENT—The Bristol Co., Waterbury, Conn., has published the following: Bulletin No. 545, introducing flow-diversion valves and milk-flow thermal-limit controllers, modern dairy equipment; Catalog No. 4050, describing modern air-operated control instruments and their applications; Bulletin 542, dealing with recording and indicating tachometers for measuring speed of rotation and travel.

CONTROL INSTRUMENTS—Merc-to-Merc temperature controllers, thermostats, relays, thermometers and hydrometers for all industrial, technical and laboratory purposes are discussed in Catalog No. 104, by The Philadelphia Thermometer Co., Philadelphia, Pa.

CONTROL INSTRUMENTS—Sarco Co., Inc., 183 Madison Ave., New York, N. Y., has issued Bulletin No. 67 introducing brine blender, Type BB, for brine recirculation control; blender, Type RB, for recirculation control on small engines; and cooling control, Type TR-40.

pH RECORDER—Two recent folders of Wilkens-Anderson Co., 11 No. Canal St., Chicago, Ill., deal with the Cameron pH recorder, which uses glass electrodes, and the Cameron pH meter with remote sampler.

VIBRATION CONTROL—Various types of vibro-isolators for concrete foundations are presented in Bulletin Ba-14, by The Korfund Co., Long Island City, N. Y.

WOULD YOU TOO
LIKE TO CUT
HANDLING COSTS 35%?
HATELY BROTHERS COMPANY
Then Read
How Hately Brothers Did It!
● SAYS E. T. Miller, V. P. of Hately Brothers Company of Chicago: "Your engineering service in which you advised certain savings would be made, has more than compensated us for the contract let at that time.
"Alvey-Ferguson Conveyors take care of all shipments and the distribution of made-up packages in the plant, resulting in very material savings to floors, trucks, benefit of elevators, etc., and we have cut costs, depending upon the various items, from 20% to 35%."
Alvey - Ferguson Engineering Service can help you, too, in reducing operating costs and increasing efficiency. Without any obligation, write for further information—today!
WRITE FOR NEW CATALOG TODAY!
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VERTICAL CONVEYORS
LIVE ROLLER CONVEYORS
Without obligation write today for this New A-F Conveyor Catalog. The Alvey-Ferguson Co., 501 Disney St., Cincinnati, Ohio.
CONVEYING MACHINERY
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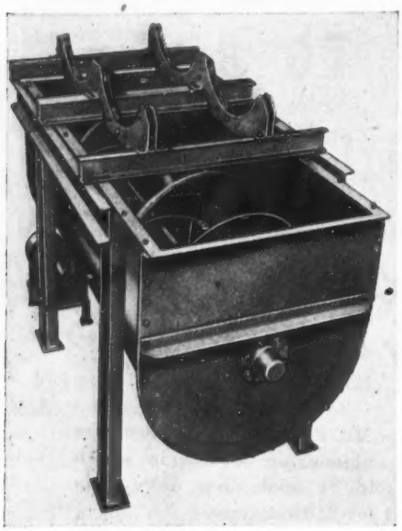
SCIENTIFICALLY PLANNED
Conveyors

Food Equipment News

REVIEW OF FOOD PROCESSING EQUIPMENT, ACCESSORIES, AND SUPPLIES

Sirup Blender

A SPECIAL BLENDER, recently designed by L. O. Koven & Bro., Jersey City, N. J., is suitable for blending such ingredients as milk, malt sirup and chocolate. It is 6 ft. long, 3 ft. wide and 3 ft. deep. Construction is of stainless-steel-clad-steel. The agitator, a double spiral ribbon of stainless steel, is motor-driven.



Sirup blender with racks for holding drums

A feature of this new blender is a pair of racks installed over the tank, so that two barrels or drums can be placed at one time for draining. These racks are equipped with rollers, so that the barrels may be rocked, in order to assure complete draining of their contents. The blender may be jacketed for heating or cooling during mixing.

High-speed Liquid Filler

HORIX MFG. Co., Corliss Station, Pittsburgh, Pa. claim in their Model HAV automatic high speed rotary filling machine the highest speed liquid filler available. This device, one of which is operating in the National Distillers' plant at Carthage, Ohio, is said to have reached a filling speed of 150 qt. a minute. It can be equipped with any number of filling valves from 16 to 48 depending upon the size of the container. For quart containers, 32 are used; for gallons, 20; and a 48 valve filler is said to have a speed of 400 pt. per minute.

To handle glass without breakage or damage at these high speeds, improved feed and discharge mechanisms have been developed. Safety devices are also incorporated to prevent damage to the machine or loss of liquid, caused by defective containers. Stainless steel has been used for all parts coming in contact with the liquid being filled. Easy accessibility for thorough cleaning has been provided.

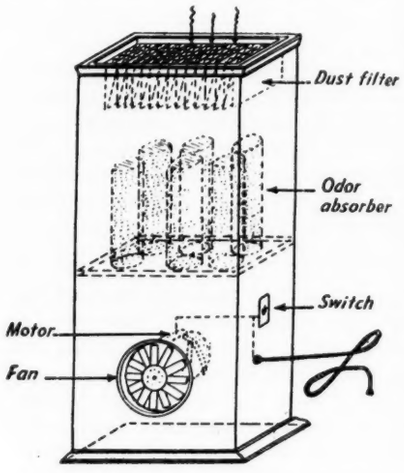
Variable Speed Transmission

LINK-BELT Co., 307 N. Michigan Ave., Chicago, Ill., has developed a vernier control for use with all sizes of its P.I.V. gear variable speed transmission. By means of this control, it is said that a very close adjustment of speed is possible, such as is needed in synchronizing the speeds of two machines, in controlling, feeding or weighing machines, or controlling wherever uniformity of operations requires close speed regulations.

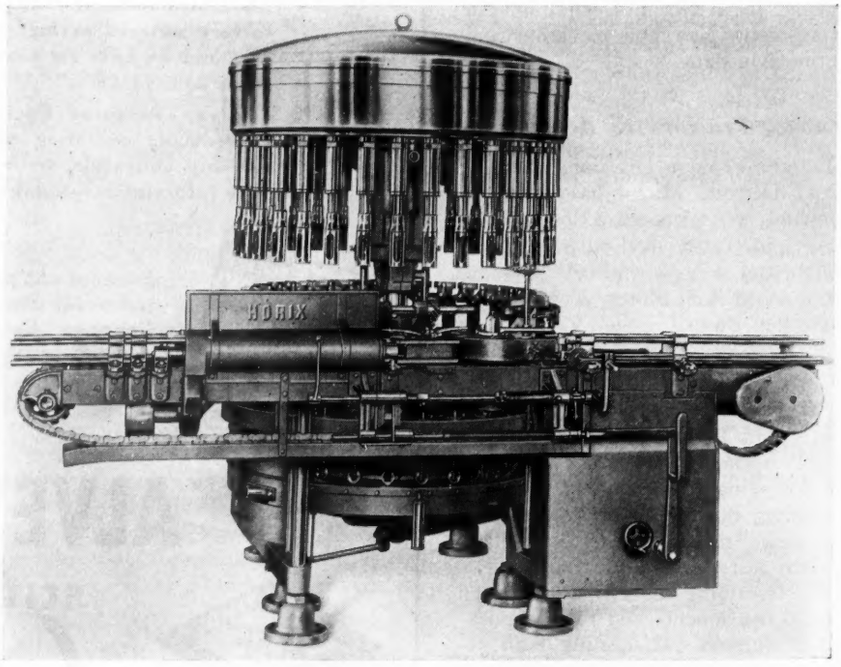
This control is available in one of two ratios—7½ to 1 or 30 to 1. It is equipped with two handwheels, one for direct control and the other, the vernier control, providing 30 turns or 7½ turns to one of the direct wheel.

Odor Absorber

FOR REMOVING ODORS from food storage spaces, W. B. Connor Engineering Corp., 114 East 32d St., New York, N. Y., has developed a self-



Unit odor absorber for food storages



High-speed filler for liquids.

Look, C. B...

PATAPAR REALLY IS *Insoluble*

"Huh", replied C. B., "we should have known about that long ago . . . It's just what we need."

Moisture was at the root of the problem. So, the young executive took a sheet of Patapar Vegetable Parchment and soaked it in water for a week. It seemed hardly credible that any paper could stand such punishment without going to pieces. But Patapar really IS insoluble!

Patapar is also grease-resisting, and odorless. It is made in many sizes, weights, and special finishes—sheets and rolls. If it suggests an answer to a problem of yours, tell us what you have in mind, and we'll send samples and full information.

Patapar
Reg. U. S. Pat. Off. & Foreign Countries
Vegetable Parchment

PATERSON PARCHMENT PAPER COMPANY

Bristol, Pennsylvania

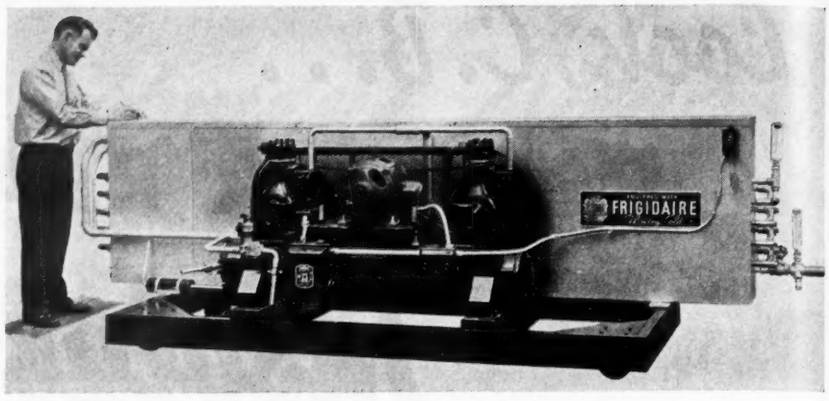
West Coast Plant: 340 Bryant Street, San Francisco, California

Branch Offices: 120 Broadway, New York, N. Y. 111 West Washington Street, Chicago, Ill.

contained odor-absorbing unit. As can be seen from the drawing, this unit contains a battery of canisters filled with activated coconut shell carbon, a dust filter and a fan for circulating the air in the room through the canisters.

Automatic Transfer Switch

ZENITH ELECTRIC Co., 845 So. Wabash Ave., Chicago, Ill. is now manufacturing an automatic transfer switch, of the spring gravity drop-out type. This is used for automatically connecting a lighting or power load to an emergency source in case a failure should occur.



Portable cooler for wine.

Wine Cooler

FRIGIDAIRE DIV., General Motors Sales Corp., Dayton, Ohio, has recently devised a completely portable wine cooler, operated by a 5 hp. Frigidaire condenser unit. This apparatus is designed to be moved up to a vat. The wine is then pumped over the cooler and during its passage is cooled to 22 deg. F. It is then pumped back into a second vat where it is allowed to stand until the temperature rises 5 deg. After this the wine is filtered. The whole operation is part of the clarifying process, used because it has been determined that filtering is more complete at low temperatures. As can be seen from the accompanying photograph, the unit is self-contained and mounted on a wheeled truck for easy portability around the winery.

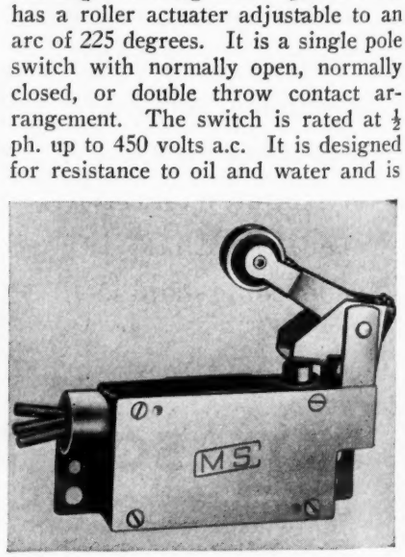
Bulk Flour Insect Killer

ENTOLETER Co., INC., Div. of Safety Car Heating & Lighting Co., New Haven, Conn., has brought out the Bulk Flour Entoleter, developed for the destruction of insect infestations in the flour stream. Unlike other Entoleters, this device uses no electricity for insect destruction, which is accomplished mechanically by means of revolving disks through which the flour is passed certrifugally, causing a squeezing, abrasive action which is said to destroy all stages of insect life, including eggs.

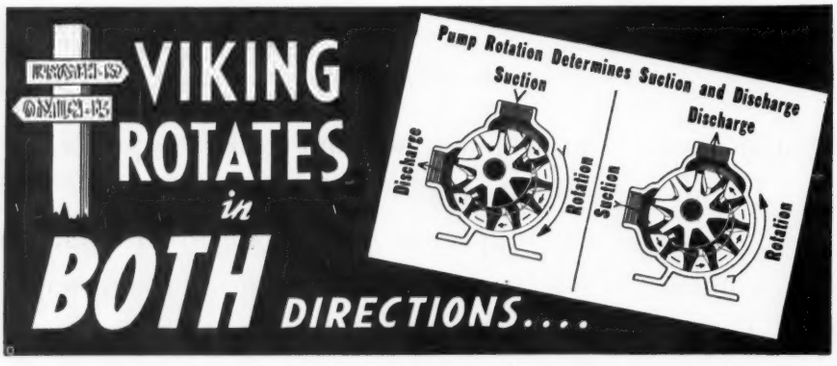
A test unit of this device has been in operation for some time in a flour mill and as a result the company is placing on the market a machine with a capacity of 50 barrels per hour which is recommended for installation directly over the bins. Sales of this new device will be handled by the office of Safety Car Heating & Lighting Co., 230 Park Ave., New York, N. Y.

Limit Switch

MICRO SWITCH CORP., Freeport, Ill. has developed the LK-2 switch, a precision limit switch for actuation by rotating or sliding cams. The switch has a roller actuater adjustable to an arc of 225 degrees. It is a single pole switch with normally open, normally closed, or double throw contact arrangement. The switch is rated at ½ ph. up to 450 volts a.c. It is designed for resistance to oil and water and is



Limit switch.



With EQUAL EFFICIENCY - - EQUAL ACCURACY

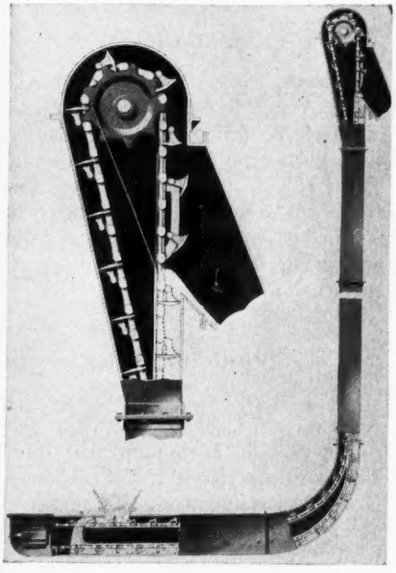
You merely reverse rotation of pump shaft to reverse flow of liquid in the Viking Rotary Pump. Figure at left shows pump with TOP SUCTION and SIDE DISCHARGE . . . at right, after reversing SIDE SUCTION and TOP DISCHARGE. Simple and practical isn't it? And it's another feature that makes Viking an ideal unit for the handling of all types of liquid and semi-solid food products. The ease with which the change can be made not only means a real saving in time—but you gain the service of an "extra" pump. Bulletin 103-35 gives you detailed information about this "2 in 1" feature of the Viking Rotary Pump . . . write for a copy. We will be glad to fill your request by return mail.

VIKING PUMP COMPANY
CEDAR FALLS, IOWA

said to have a life of over one million operations.

Conveyor for Granular Material

JEFFREY MFG. Co., Columbus, Ohio, has developed the "Mass-Flo" elevator-conveyor for handling all sorts and finenesses of granular material. The device consists of a steel casing through which solid pivoted flights mounted at regular intervals on a single chain are moved, causing the material to flow horizontally, vertically or at an incline through the steel casing. Flights are discharged of their load by means of a tripper, as shown in the enlarged view in the accompanying photograph. Since each flight carries a full or partial load depending upon the rate of feed, the conveyor can be emptied after feed stops. Arrangements can be made to feed or discharge this conveyor at any point. In operation it is said



Conveying unit for handling granular material.

that the conveyor subjects the material to only slight agitation, thus avoiding breakage or the production of fines. Advantages claimed for the new unit are low initial cost, small space requirement, and the fact that the device is self-feeding and self-cleaning.

Flame Detector

BAILEY METER Co., 1050 Ivanhoe Road, Cleveland, Ohio, has developed a flame detector, a device for enabling the operator of a furnace to determine whether or not ignition is taking place. This detector consists of a photocell which is air-cooled and so mounted as to "see" the flame at the point where ignition begins to take

A NEW PEAK in Versatility .. Size Range .. Ease of Operation

It's easy to see why so many manufacturers are installing the Model FA-Q in their plants. In the FA-Q, they find *versatility* at its peak of development. . . . They also find that this machine hits the high mark in *size range* and *ease of operation.*

Wraps many different types of packages, including extension-edge boxes, open boats, and turned-up-side trays, as well as ordinary cartons. May be equipped to handle transparent cellulose, glassine, waxed paper, foil, or plain paper wrappers—with Electric Eye registration, if desired.

The FA-Q may be adjusted for different sized packages in only ten minutes. All parts are readily accessible. All adjustments are made by convenient hand-wheels—no tools.

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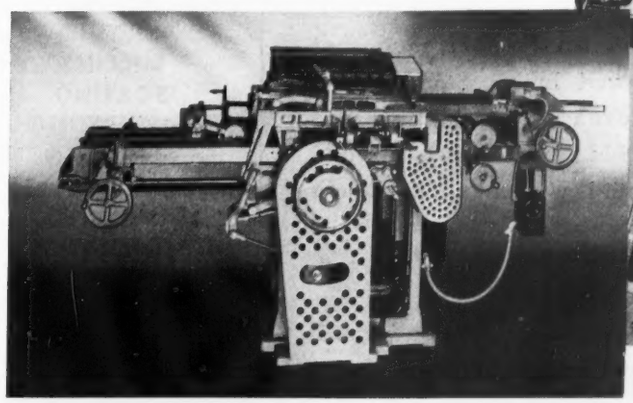
Melbourne, Australia: Baker Perkins, Pty., Ltd.



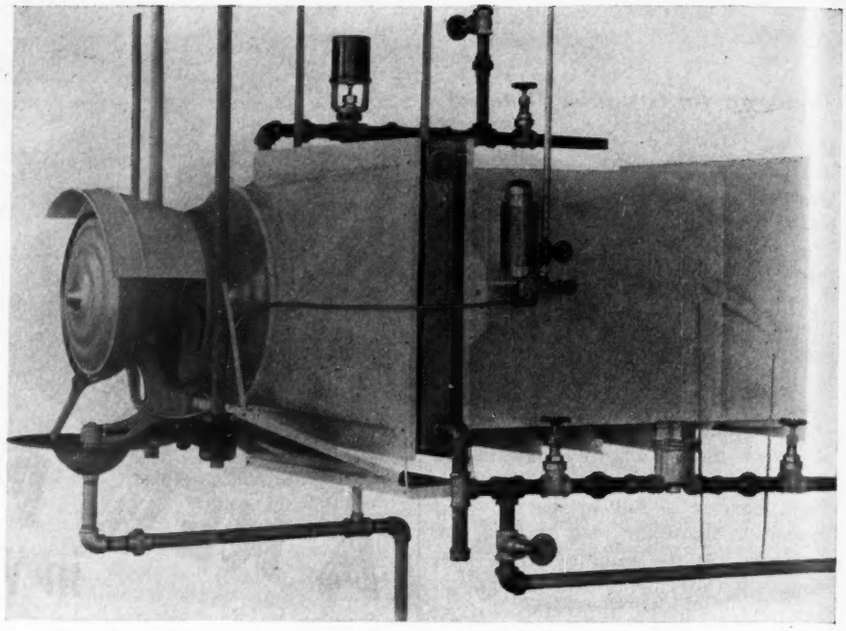
MODEL FA-Q

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

place. As long as the burner maintains ignition, the light from the flame acting on the photocell causes a current to flow through a relay. Interruption of the flame interrupts the current and an alarm is thus caused to sound. The detector also shows variations in the flame by means of a milliammeter, which "flutters" as the current through the photocell varies with flame intensity.

Dough Room Unit

THE BAHNSON CO., Winston-Salem, N. C., has developed a dough room unit for the air conditioning of dough rooms, wrapping rooms and other relatively small spaces where it is desired to maintain a definite relative humidity and temperature. This unit is built in two sizes, Type A employing a ¼ hp. motor and type L a ¾ hp. motor. The unit is equipped with complete automatic controls for feeding steam to the heating section during the winter or feeding ice water to the same section for cooling purposes during the summer. Humidity is automatically controlled. Air is drawn from the outside through a filter and is proportioned with recirculated air by means of dampers adjusted by a chain mechanism. After proportioning, the air is drawn through the heating or cooling section and passed over the humidifier. One fan located on the humidifier is sufficient to effect all necessary air movement.



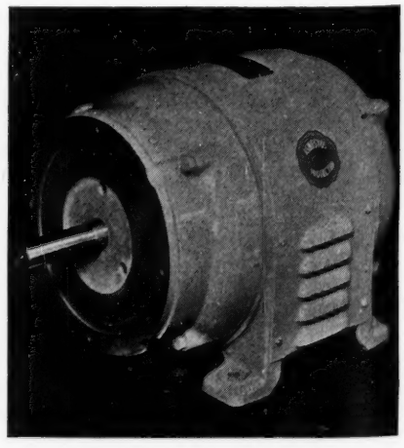
Unit for air conditioning dough rooms or similar spaces.

Sight Glass

COCHRANE CORP., 17th St. and Allegheny Ave., Philadelphia, Pa., is making a closed fitting of the visible-flow sight glass type for use with pressures up to 125 lb. per sq. in. This fitting comes in 2½, 3, 4, 5, 6 and 8 in. nominal sizes and is a flanged fitting measuring 13¼ in. between finished surfaces, in all sizes.

Mountable Motor

U. S. ELECTRICAL MOTORS, INC., Los Angeles, Calif., has developed a motor equipped with "Unimount" end shields. These shields have a flat surface to facilitate the mounting of pumps and other equipment in a single assembly with the motor. The equipment can be assembled on either end of the motor as desired. These end shields may be obtained in a number of stand-



Motor provided with end shield for mounting.

Speaking of Operations—

—let us tell you about *yours*. After all, that is our business . . . demonstrating how any one of the operations listed at right can be done quicker, better or cheaper with the type of equipment we design and build. Standard designs of proven efficiency are available for a wide range of processes and materials, but if your requirements are new and different we will assume the experimental work without charge or obligation. Write us briefly concerning the problem involved and we will give you an intelligent reply based on long experience by return mail.

CUTTING
CRUSHING
GRINDING
MIXING
SIFTING
MILLING
SORTING
PULVERIZING
FLOCKING
DEFIBERIZING
MASTICATING
CLEANING
ELEVATING
CONVEYING
Etc., Etc., Etc.

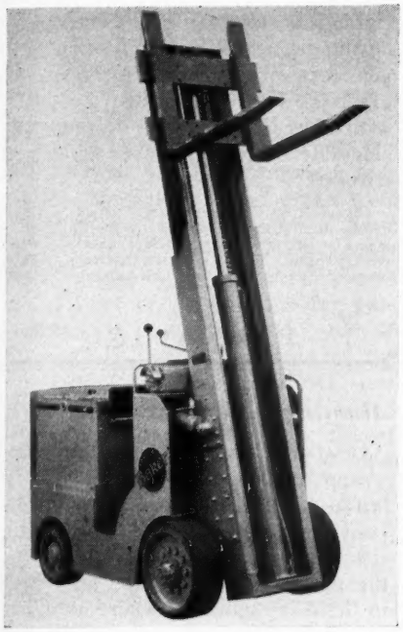
ROBINSON MANUFACTURING CO.
71 Painter St., MUNCY, PA.

ardized outside diameters, mounting machine fits, and bolt circles. They are also available in unmachined form, allowing the user to machine the mounting dimensions to suit his unit. Advantages claimed for this design are elimination of the necessity for an adaptor, saving in mounting time, and provisions for closed, drip-proof protection for the motor.

Fork Trucks

BAKER-RAULANG Co., Cleveland, Ohio, has brought out a series of center-control fork-type electric industrial trucks, designated Type JOM, Series F, in capacities from 2,000 to 7,000 lb. These trucks are available in titling or nontilting, telescoping or nontelescoping models, as desired.

Hydraulic lifting mechanism of new design is the feature of this new series of trucks. The same motor and

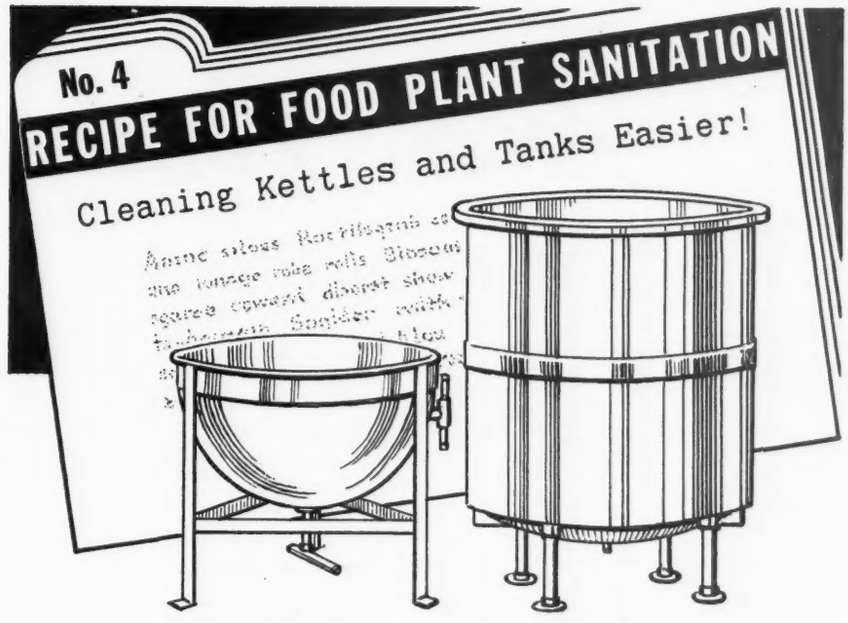


Hydraulic lifting and tilting mechanism features this new design of fork-type truck

pump also operates the hydraulic tilting mechanism. Total lifts up to 126 in. are available.

Recording Controller

FOXBORO Co., Foxboro, Mass., has brought out a new series of air-operated potentiometer recording controllers. These new instruments incorporate three features for the first time: (1) an improved detecting mechanism, (2) a new integral recording and control mechanism, and (3) a new control system to provide maximum flexibility. Open and shut action or throttling action, with or without automatic reset, is available in these air-operated models.



How Efficiency of QUALITY CONTROL Sanitation Methods Is Increased with Oakite Materials

WOULD you be interested in a better, faster, more economical way to clean your cooking kettles, tanks, vats, retorts and other food processing equipment?

Then investigate how Oakite materials and methods are so successfully and effectively helping canning and packing plants everywhere more easily increase the efficiency of their QUALITY CONTROL sanitation procedures. Because with the recommended Oakite materials, experience shows that juices, food or vegetable deposits, burned-on fats, greases and other accumulations are speedily removed from equipment, with little effort, due to the emulsifying and fast wetting-out properties of Oakite materials especially designed for this work. Remember too, that these materials are safe to use on aluminum, stainless steel, nickel, Monel metal, tinned or copper equipment.

Still another highly successful Oakite method for keeping processing equipment scrupulously clean and sanitary, is steam cleaning. Food plants using steam cleaning find that by applying a solution of the recommended Oakite material with the Oakite Solution-Lifting Steam Gun, even the toughest jobs are made easy, with little time and effort required. And . . . cost of doing the work is amazingly low.

OVER 53 DIFFERENT OAKITE MATERIALS AVAILABLE

Whatever food product you can or pack . . . you will find there is an Oakite material and method that will more easily help you protect product quality, purity and flavor.

Inasmuch as all Oakite materials are backed by a binding GUARANTEE, why not investigate today the many advantages and benefits they provide? Write for FREE booklets on your industry!

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Food Technology

NEW DISCOVERIES & INVENTIONS

FOOD ENGINEERING

Humidifying Freezers To Prevent Freezer Burn

A FEW per cent difference in the relative humidity near the saturation point may decide between satisfactory operation of commercial freezers and economic losses through depreciation of food products because of loss of bloom and freezer burns resulting from surface desiccation.

Due to continuous removal of moisture from the air by condensation on the cooling coils, it is difficult with present methods to maintain relative humidities above 85 per cent in commercial freezers, although higher values may prevail temporarily. Adequate protection from surface desiccation, however, requires relative humidities of 95 per cent or higher, unless exceedingly low storage temperatures (below —20 deg. F.) can be provided economically. Such a decrease in temperature represents a 30 per cent increase in the refrigeration load, to say nothing about the reduced capacity of the compressor at this low temperature.

A more economical reduction in the drying problem is claimed by a new humidification process, involving continuous return of the condensate moisture to the air in the form of steam. Ice formation on the coils is prevented by circulating a sufficiently concentrated brine (calcium chloride density 1.200) over the coils. Maximum evaporation with minimum heat input is accomplished by heating a portion of the brine to the boiling point while providing continuous circulation through the heater to prevent troublesome concentration of the nonaqueous phase.

The necessary equipment is designed for regulating the proportion of the water to be evaporated, controlling the rate of flow through the heater, and balancing the heat input with the water to be evaporated. Savings from otherwise reduced rates of heat transmission to the coils, resulting from ice formation and waste of ice on defrosting (at least 144 B.t.u. per pound of ice), easily offset the energy necessary for operating the small pump motor required for circulating the brine.

Digest from "Humidification of Freezers," by W. H. Cook, *Refrigerating Engineering* **38**, 229, 1939. This paper was presented at the Second Food Technology Conference, Cambridge, Mass., June 30, 1939.

BEVERAGES

Fruit Juice Fermentation

FRESH ORANGE JUICE naturally contains nitrogen compounds, assimilable for yeasts such as *Saccharomyces ellipsoideus,* in sufficient quantity for the primary fermentation stage. Heat sterilization under pressure destroys most of the organic nitrogen and much of the ammonia nitrogen in sweetened orange juice. The extent of the destruction depends on the pressure and duration of the sterilization treatment. The resulting loss in assimilable nitrogen is not in itself sufficient to hinder the primary fermentation, but it does inhibit the later stages of fermentation, namely film formation and oxidation.

In pure grape juice, heat sterilization under pressure has much less effect on the assimilable nitrogen compounds than in orange juice. If fermentation is allowed to proceed, the sterilized juice regains its assimilable nitrogen content, at least in part. Hence sterilization must destroy the fermenting organisms, not merely their nitrogen supply, to be successful.

Digest from "Role of Nitrogen Compounds in the Fermentation of Fruit Juices," by N. N. Chopra, *Proceedings of the National Institute of Science, India* **4**, 289, 1939 (Published in India).

Centrifuging to Check Fermentation

A FAIRLY EFFECTIVE CONTROL of the fermentation rate can be achieved in apple ciders by centrifuging the juice at certain specific gravity intervals. The idea is to whirl out the nutritive material on which the yeast grows. Effectiveness of the treatment depends upon the nitrogen content of the fresh juice, although the inclusion of nonassimilable nitrogen in the analytical figures precludes a direct correlation between the total nitrogen content and the subsequent behavior of the ciders.

Juices high in nitrogen (0.018 per cent) respond to centrifuging to a lesser degree than low nitrogen juices (0.0053 per cent). For the latter a single centrifuging is sufficient to stabilize the cider. With few exceptions, fermentation stops when the nitrogen content drops to 0.004 per cent.

Fresh juices, direct from the press, lose different amounts of nitrogen through centrifuging. Centrifuging during fermentation removes up to 96 per cent of the total nitrogen, the greatest loss occurring invariably with ciders which have dropped considerably in gravity before being centrifuged.

Digest from "Fermentation Control of Ciders by the Centrifuge Method," by V. L. S. Charley, *The Brewer and Wine Merchant and Brewers Guardian,* 172 and 95, respectively, September and October, 1939 (Published in England).

PACKAGING

Aluminum Food Containers

ALUMINUM CANS and aluminum foil wrappers have overcome much of the initial opposition to their introduction. In Italy, where a systematic promotion campaign has been carried on, the greatest headway has been made in the dairy industry, where aluminum has proved its merit not only in economy but also as a hygienic material. Milk, being always on the acid side of neutrality, does not attack aluminum and keeps longer therein than in perfectly tinned tin plate cans. Aluminum dairy equipment is similarly advantageous, e.g., in pasteurizers, cheese vats, churns and the like. Butter wrapped in aluminum foil is thoroughly shielded from light and so is protected from rancidity.

Aluminum is also entirely inert to oils and fats, including fatty acids, and is useful not only in containers for these materials but also in processing equipment such as hydrogenation apparatus and storage or transport tanks. Aluminum cans for sardines and other fish products have shown good durability in storage tests.

The canning industry is finding

aluminum cans useful for many vegetables and for marmalades, jellies and the like. Products canned in brine, vinegar, oil or their own juice are successfully packed in aluminum. The confectionery industry is making considerable use of aluminum foil wrappers. In general, the chief advantages of aluminum are light weight, corrosion resistance and the ease of recovery for re-use.

Digest from "Uses of Aluminum in the Food Industries," by Antonio Montefredine, *Industria Italiana Delle Conserve* 14, 142, 1939 (Published in Italy).

CANNING & FREEZING

Natural Green Color Fixed In Canned Vegetables

FIXATION of green color natural to fresh peas, spinach and asparagus without injury to the flavor or texture of the vegetable during heat treating and storage constitutes the invention disclosed in U. S. Patents Nos. 2,186,003 and 2,189,774 granted to James S. Blair, Maywood, Ill.

In its simplest application the method calls for the addition of suspended $Mg(OH)_2$ and $Ca(OH)_2$ to the canning brine. Presence of these alkalies, in proportions corresponding to 6.50 grams of MgO and 3.25 grams of CaO per gallon of brine for peas blanched in fresh water at 180 to 190 deg. F., holds the liquid of the vegetable during retorting and storage at the acidity level of pH 6.5 to 6.9. This is normal for the juice of fresh vegetables and gives good retention of the natural fresh green color. In the absence of alkalies, the canned vegetable juices have an acidity of pH 5.8 to 6.4, which is destructive to the green color.

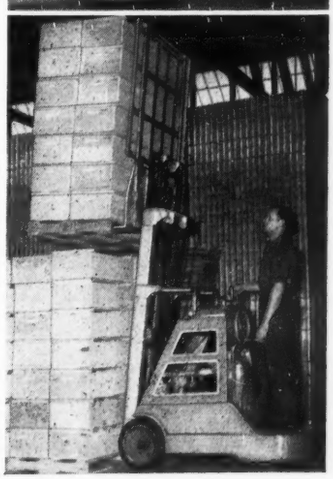
By adding small quantities of $NaHCO_3$, $Mg(OH)_2$, $Ca(OH)_2$ or mixtures of the last two alkalies to the blanch water, the vegetables retain a deeper green color than when the normal water blanch is used.

Soaking the peas for 3 hours in fresh water, or in water at room temperature to which NaCl has been added, permits cutting the quantities of alkalies to one-half, equivalent to 3.25 grams of MgO and 1.62 grams CaO per gallon of brine.

When the method is carried out under the soaking procedure the canned peas have the fixed green color, the necessary alkali reserve to keep juice at desired pH level, and a magnesium and calcium content approximately the same as untreated peas.

As perfected (U. S. Patent No. 2,189,774) the method provides for

MOBILIFTING IS ECONOMICAL MATERIALS HANDLING



Progressive canners are finding a new way to handle goods economically . . . . They're MOBILIFTING!

MOBILIFTS carry raw materials, empties and packed goods in, around and about plants faster and more economically. MOBILIFTS are a new boon to cannery operators. In fact, an owner said, "My MOBILIFTS paid for themselves in less than one season." Plan to modernize your plant this year and you'll see how production is speeded up and profits increased.

MOBILIFTS cost less than 25c an hour to operate. Designed with special folks for cannery use, prices begin a little over $1000 at factory. Light in weight (approx. 2600 lbs.) Carry up to a ton and can lift up to a 14-ft. ceiling. Write for special cannery bulletin.

MIGHTY MIDGET MOBILIFT
TRADEMARK REGISTERED U. S. PAT. OFF.

MOBILIFTS are cutting costs more than 50% in many food industry plants throughout the United States. Illustrated above are two examples of MOBILIFT operation.

MFG. BY VAUGHAN MOTOR CO., 842 S. E. MAIN, PORTLAND, OREGON

soaking in a sodium salt solution at not to exceed room temperature to establish an alkaline reserve, followed by blanching in a $Ca(OH)_2$ solution to prevent rupture or softening of the vegetable. $Mg(OH)_2$ is added to the canning brine to give the vegetable suitable texture and to maintain the alkaline reserve against development of acidity during heating and storing.

Both patents are assigned to American Can Co.

DAIRY PRODUCTS

Advantages of Cooked Flavor in Milk

MILK when heated develops a cooked flavor at a particular temperature, depending on how long it is held at that temperature. Thus for flash heating the cooked flavor develops at 170 deg. F., at 15-minute hold at 160 deg., and for 30-minute hold at 150 deg. The cooked flavor is caused by sulphides liberated from some of the proteins broken down by heat. Probably the albumen and the fat globule membrane protein are the chief sources. Traces of copper delay the formation of the cooked flavor and cause it to disappear on storage, even more rapidly if added after the heat treatment is completed. But copper will subsequently cause a tallowy oxidized flavor to develop.

The sulphides act as reducing agents and so prevent the destruction of vitamin C by oxidation. Traces of copper counteract this. Hence, somewhat contrary to popular belief, high heating of milk free from copper contamination actually preserves the vitamin C content. When tallowy flavor develops, it is due principally to oxidation of the phospholipids in the fat membrane protein. [This liberation of sulphides by high heat is the cause of the discoloration of the inside of evaporated milk cans and the reason why that product never develops a tallowy flavor.—Ed.]

Digest from "Cooked Flavor in Milk, Its Source and Significance," by D. V. Josephson and F. J. Doan, *The Milk Dealer*, November, 1939.

Preserving Cream with Salt

A "PUBLIC SERVICE" PATENT issued to a Department of Agriculture worker recommends the addition of 7 per cent of common salt to churning cream held on the farm to preserve it. This salt may be added in proportion as each day's cream is poured into the can, or the entire amount of salt estimated to be needed for the whole gathering period may be put in the can at the start. Obviously this last method means that the concentration of salt in the cream at first is considerably increased. Both methods preserve cream well up to 8 days at 77 deg. F., but adding all the salt at the start is better. Acidity does not increase as much as in unsalted cream, bacteria develop more slowly at first, and the oxidizing types of bacteria believed to cause rancid and cheesy flavors are practically eliminated. Butter made from salted cream stored 8 days at 60 or 77 deg. scored one point more for flavor than butter made from normal cream stored 8 days at 50 deg.

Digest from "Preserving Cream with Salt," by C. H. Castell and E. H. Garrard, *The Canadian Dairy and Ice Cream Journal*, 18, 7, 19, 1939 (Published in Canada).

EDITOR'S NOTE—This method was tested some time ago by the Bureau of Dairy Industry, U.S. Department of Agriculture, but it was not publicized because of the attitude of the Food and Drug Administration, another bureau in the U.S.D.A. This attitude apparently is to discourage what appears to be a reasonable and wholesome method of improved preservation of cream.

Gelatine and Sodium Alginate To Stabilize Ice Cream

SODIUM ALIGINATE is best added to ice cream mix at 160 deg. F. in dry form together with the sugar, or else dispersed in water. Add it before homogenization. Because of the almost immediate effect of this stabilizer on the viscosity of the mix, excessive amounts will delay the cooling and pumping operations. The influence of gelatine on viscosity, on the other hand, is a function of time as well as temperature. Ice cream stabilized with sodium alginate appears to have less color on freezing; its slightly alkaline reaction lowers the titratable acidity and the pH in the mix.

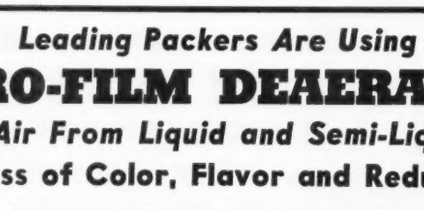
The relative effect of these two stabilizers upon the whipping quality of the mix and the body of ice cream varies with the conditions of the comparison, particularly the mineral content of the mix and the kind of freezer used. The addition of about 0.3 per cent of sodium alginate (Dariloid) to a 12 per cent mix gives approximately the same stabilizing effect as that obtained with 0.25 per cent of a 225 Bloom gelatine. In mixes containing higher solids, the amount of both stabilizers has to be reduced proportionately. Variations in the types of sodium alginate and gelatine prevent the establishment of definite comparisons between these stabilizers. When using the foregoing recommended amounts, practically equal conditions

Leading Packers Are Using

MICRO-FILM DEAERATORS

To Remove Air From Liquid and Semi-Liquid Products

Preventing Loss of Color, Flavor and Reducing Spoilage



Micro-Film Deaerators are designed to deaerate such products as

GRAPEFRUIT JUICE
PINEAPPLE JUICE
TOMATO JUICE
CATSUP
APPLE JUICE
ORANGE JUICE
CONCENTRATES
HONEY
MUSTARD
SALAD DRESSING
FRUIT AND NUT BUTTERS
JAMS AND JELLIES

The Micro-Film Deaerator removes virtually all air contained in food products. It has automatic controls; no moving parts. It is stainless steel fabricated and can be opened and cleaned in five minutes.

Write us today for our Micro-Film Deaerator bulletin.

THERMAL RESEARCH CORPORATION
RICHMOND, VIRGINIA

Manufacturers of High Speed Pasteurizers—Coolers—Deaerators—Heat Exchangers

are obtained with respect to whipping time and body. With certain freezers more favorable results are obtained with sodium alginate. Ice creams stabilized with sodium alginate melt more rapidly at room temperature and have a smoother appearance. Neither stabilizers cause objectionable off odors or variations in flavor.

Digest from "A Comparison of Gelatine and Sodium Alginate as Stabilizers in Ice Cream," by P. H. Tracy and S. L. Tuckey, *Food Research* 4, 335, 1939.

MEATS & FISH

Salt Inhibits Spoilage In Canned Meats

SATISFACTORY STERILIZATION of lunch tongue, veal loaf, chili con carne with beans, and brains with gravy depends not only on proper heat treatment (50 minutes at 240 deg. F., or 120 minutes at 220 deg. F.) but also on the inhibitive effect of the salt in the product. Whereas 2.5 per cent salt greatly reduces spore germination, 5 per cent is sufficient to inhibit mold growth almost completely. Spore resistance is greatest at pH 6.12, lowest at pH 4.93, and intermediate at pH 5.32.

Digest from "Studies in Processing Canned Meats," by J. Yesair and E. J. Cameron. Presented before the Meat Section of National Canners Association, Chicago, January, 1940.

Freezing Increases Salt Uptake in Fish

HALIBUT, coho salmon and gray cod are practically unaffected by quick freezing. Chum salmon freezes the least well. Pink salmon is next better.

Tests by a selected tasting panel indicate that significant differences in the quality of frozen spring salmon due to variations in rate of freezing and storage temperatures below 10 deg. F. become evident only after eight weeks in storage. With salmon and halibut, the storage temperature appears to be more important than the freezing rate. Best results are obtained when quick freezing and low storage temperatures are combined.

An important factor, previously not recognized, is the effect of freezing on the salt uptake of fish muscle. Frozen samples of gray cod, when cooked, were less salty (3.18 per cent), and therefore preferred, than the control (3.50 per cent) which had been kept on ice. Although raw, the frozen fish had a higher salt content (4.10 per cent) than the fresh fish (3.92 per cent). It appears that freezing increases the permeability of the muscle, so that it absorbs salt more readily. In cooking, however, the salt is also given up more readily accounting for the greater mildness of the cooked frozen fish. Due to this fact, the salt uptake of gray cod can be increased during brining prior to freezing, thus rendering the smoked product less perishable.

In halibut, the salt absorption increases from the head toward the tail, whereas in spring salmon the midsection takes up the least salt, the head section slightly more, and the tail portion most of all.

Under similar brining conditions, halibut absorbs salt more readily and spring salmon least readily, with coho, chum and pink salmon between these extremes in respective order. The amount of salt taken up by different species is probably related to the oil content of the fish muscle. These marked variations in behavior necessitate individual study of each species.

Digest from "Further Tasting Panel Tests on Frozen and Stored Fish," by O. C. Young, Progress Report No. 42 of the Pacific Biological Station, Nanaimo, B. C., and Pacific Fisheries Experimental Station, Price Rupert, B. C., page 16, 1939. (Published in Canada).

OILS & FATS

Smoke, Flash and Fire Points Of Soybean Oil

THE U. S. Regional Soybean Industrial Products Laboratory has endeavored to reconcile the conflicting data in the literature by a series of A.S.T.M. standard tests. Considerable difference has been found between the characteristics of the refined and the crude soybean oil. And an almost equal difference was observed between crude oil expeller-recovered and crude oil solvent-extracted. The lowest flash and fire points were observed with the crude expeller oil. The refined oil showed the highest flash and fire points. The following table summarizes the determinations.

Smoke, Flash and Fire Points of Soybean Oil

Type of oil	Crude		Refined
	Expeller	Extracted	
Number of determinations	4	5	11
Smoke point (deg. F.)			
min.	350	328	382
max.	377	425	492
avg.	360	393	459
Flash point (deg. F.)			
min.	560	585	618
max.	588	615	630
avg.	573	602	624
Fire point (deg. F.)			
min.	657	665	673
max.	668	680	685
avg	664	672	681

Digest from "Smoke, Flash, and Fire Points of Soybean and Other Vegetable Oils," by S. B. Detwiler, Jr., and K. S. Markley, *Oil and Soap*, 29, February, 1940.

Butter versus Vegetable Oils

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oil with skim milk. To these milks were added adequate amounts of vitamins, and the experimental animals were irradiated daily. Weanling rats were raised on these different milks. Good growth was obtained with all, but butter fat was very definitely superior in the first two or three weeks, giving greater gains in weight, and better appearing animals with superior coats of hair. Adding the unsaponifiable matter extracted from butter to the other oils did not improve them. There was considerable difficulty in reproduction and raising pups with females fed on the vegetable oils but not on butter, despite the addition of crystalline vitamin E.

Digest from "The Comparative Nutritive Value of Butter Fat and Certain Vegetable Oils," by E. J. Schantz, C. A. Elvehjem and E. B. Hart, *Journal of Dairy Science* **23**, 181, 1940.

MILLING

Flour Bleaching and Maturing

REDUCTION in yellow color, improvement in baking properties, and increase in water absorbing power are properties attributed to wheat flours treated with the product formed by the reaction between sulphur trioxide and the nitrite of a metal such as sodium, lithium, potassium, or calcium.

As set forth in U. S. Patent No. 2,175,172, granted to Souren Z. Avedikian, New York, N. Y., the reaction product consists of less than 3 molecular parts of sulphur trioxide to 1 part of the nitrite and is a solid capable of being ground to a white powder. In that form, mixed with some water absorbing agent such as anhydrous sodium sulphate, silica gel, or the like, it is finely ground in with the flour on the basis of 1 lb. of the mixture (sulphur trioxide 80 parts, sodium nitrite 69 parts, sodium sulphate 16 parts by weight) to 7,000 lb. of flour.

Moisture content of the flour is regarded as sufficient to liberate the nitrogen oxides which do the bleaching. The resulting residue of the chemical decomposition is identified as neutral sodium sulphate.

Hulling and Bleaching Rye

CEREALS, especially rye, can be separated from the hulls while being bleached, according to German Patent 679,864 (granted Aug. 15, 1939, to Fritz Stuff, Glogau, Germany). The grains are heated while being sprayed with a sulphite solution, for example, 5 per cent sodium sulphite in water. The moistened grains are cooled, dried and then separated from loosened particles of hulls and chaff. If desired, the grains may be exposed to nitrogen oxide gas during cooling and drying.

PICKLING

Lactic Acid for Pickles—I.

PICKLES from cucumber salt stock can be freshened in 8 to 10 hours by the following procedure, thus saving time and improving both the quality and firmness of the pickles as well as reducing the hazards of spoilage.

Water is added to the pickles at a rate of about 67 lb. to 50 lb. of salt stock; by introducing steam the temperature is raised to 43.3 deg. C. (110 deg. F.) within one hour. After cooling to room temperature, the water is drained off. An equal quantity of water containing 1 lb. of alum per 3 bu. of pickles and 1 lb. of turmeric per 200 gallons of water and pickles is again added. After draining and circulating fresh water through the tank at a moderate rate, the pickles are ready for acidification. Salt is removed from small pickles at a faster rate than from medium sized ones.

Pickles of different size as well as pickles of the same size and different portions of the pickles absorb different amounts of acid.

Acetic acid penetrates the pickles much faster than lactic acid. A combination of the two acids increased the rate of penetration over that of the acetic acid. When lactic acid alone is used in concentrations of 4 to 5 per cent, the pickles spoil within a week, indicating that this acid can only be employed in combination with acetic acid.

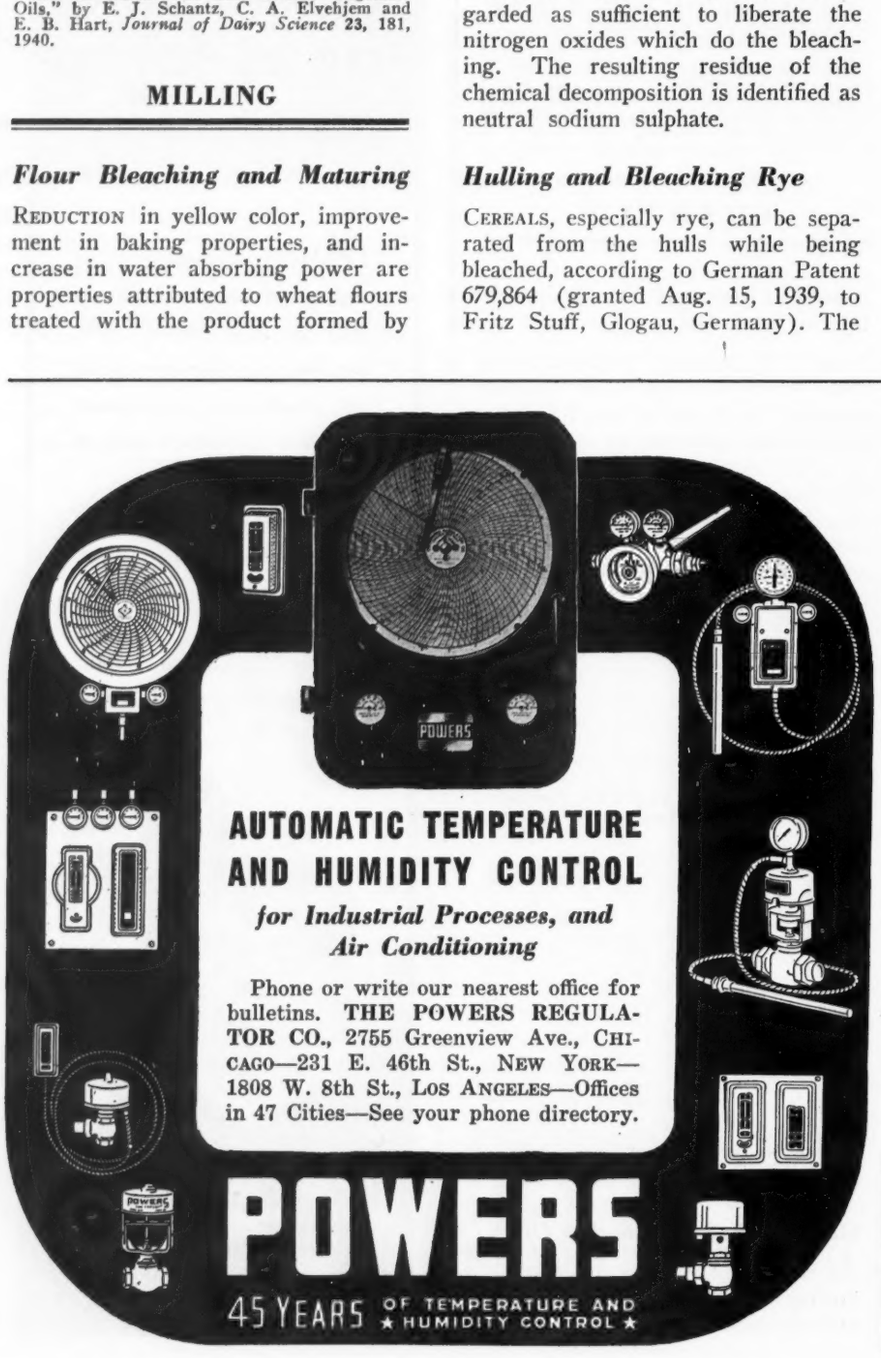
Small pickles absorb 75 to 80 per cent of the total amount of acid finally absorbed within the first 6 hours in the acid bath, the rest of it being absorbed in the following 34 hours. Besides the acid concentration, the ratio of weight of pickles to weight of acid present is important for the period necessary to reach equilibrium.

Digest from "Rate of Penetration of Acetic and Lactic Acids in Pickles," by F. W. Fabian and C. K. Wadsworth, *Food Research*, 4, 499, 1939.

MISCELLANEOUS

Egg Storage

THE CHELMSFORD EGG SUPPLY CO. utilizes a process for the preservation of eggs which, it is claimed, keeps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them fresh indefinitely. It is said that, if eggs are frozen below 28 deg. F. they crack, so that storage by freezing is impracticable. Storage in gas is better, but it takes time for the gas to percolate through the shell. The company has, however, overcome this difficulty. Every egg has a small air space at the top. This increases as the egg ages. By means of a pump the air is extracted and replaced by carbon dioxide and nitrogen under a pressure of 250 mm., this pressure being maintained all the time the eggs are in storage. The eggs are stored in large cylinders each holding 234,000 eggs and are kept at a temperature of 30 deg. F. Each refrigerating unit is driven by a 6 hp. motor, and in addition, two extra motors are employed, 5 hp. and 2.75 hp. respectively, for circulating the water and ammonia. The gas tight cylinders in which the eggs are stored look like large boilers. An additional chamber held at a much lower temperature is used for freezing liquid eggs, that is, those which have been accidently cracked, and are sold to local bakeries. The electricity taken per annum from the public supply is nearly 60,000 units. As this load is very nearly constant, and is heaviest during the summer months, the load factor is excellent and an attractive rate is available. The seasonal difference in the price of eggs practically makes up for the cost of storage.

Digest via *Nature* 144, 545, 1939 (Published in England).

Fatty Acids Inhibit Mold Growth

MANY FATTY ACIDS containing from 1 to 14 carbon atoms are remarkably effective mold inhibitors. Their fungistatic properties are rather specific with the individual acid, depending upon its chemical structure (length of the carbon chain), concentration and pH of the media.

Saturation of the molecule, and branched side-chains, especially if the latter occur near the carboxyl group, tend to decrease the fungicidal qualities. Among the saturated acids, formic and acetic acid are about equally effective for suppressing mold growth.

Variations in the pH affect the fungistatic properties appreciably. Whereas acetic acid is slightly stronger than formic acid above pH 3, the latter is more fungistatic between pH 2—3, probably due to the reducing power of the formic acid molecule. At pH 2, capric acid is not fungistatic, probably because of its practical insolubility at this pH; otherwise, it is especially effective over a wide range of pH. Propionic acid rather prevents than destroys mold growth.

The fact that, in a neutral medium, acids containing 8 to 12 carbon atoms are the most effective fungistats led to an investigation of their nutritional value, as mold growth can be considered analogous in many respects to the growth of other cells. Therapeutic qualities were suspected of certain fatty acids, such as in case of fungus diseases of the skin, tuberculosis, etc.

If it is true that the shorter chain fatty acids are valuable nutritionally, special attention should be given to the types of fat entering into the normal dietary, as most fats used for human consumption contain fatty acids with 16 to 18 carbon atoms. For instance, goat milk fat, which has been considered beneficial in tuberculosis, contains more of the fatty acids in the 8-12 carbon atom range than does butter fat. Biochemical studies of these fatty acids with respect to certain diseases may prove of great nutritional significnace.

Digest from "Fungistatic Properties of the Fatty Acids and Possible Biochemical Significance," by C. Hoffman, R. T. Schweizer and G. Dalby, *Food Research* 4, 539, 1939.

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Formulas for Foods

Corrections

FORMULA No. 15, Chocolate Flavored Sirup, page 660, November, 1939. In the last paragraph of the working directions change "served" to "filled."

FORMULA No. 20, Pineapple Sirup, page 661, November, 1939. Change 1,380 gal. of sugar to 1,380 lb. of sugar.

FORMULA No. 25, Butterscotch Sauce, page 712, December, 1939. Change 10 lb. of corn sirup to 20 gal.

FORMULA NO. 62

Chocolate Fudge Icing

Chocolate fudge base	**3 lb.**

(See Formula No. 52)

Boiling water	**1 lb.**

Mix well and add:

Sugar (4X)	**5 lb.**

Beat to required consistency.

Apply warm, but it can be spread cold.

Formula from Parker-Broeg, Boston.

FORMULA NO. 63

Fresh Farmer Sausage

(Must be cooked before eating)

Boneless chucks	**65 lb.**
Regular pork trimmings	**35 lb.**
Dry milk solids	**3½ lb.**
Ice water	**3½ lb.**
Sodium nitrate	**3½ oz.**
Salt	**3 lb.**
Dextrose (corn sugar)	**6 oz.**
White pepper	**6 oz.**
Cardamom	**2 oz.**

Grind beef through ⅛ in. plate. Then lay meat on bench, about 4 to 5 in. thick. Take about half of the dry milk, water, cure and seasoning and sprinkle over a layer of meat. Spread pork trimmings evenly over meat and sprinkle the remainder of dry milk, water, cure and seasoning over pork. Run all through ¼ in. plate. Spread all meat in shallow pans not over 8 in. deep and place in cooler at 38 deg. F. Let cure 48 hours. Stuff in beef middles, or 2¼ in. size artificial fibrous casings 18 to 20 in. long. Smoke at 90 to 100 deg. F. for 10 to 12 hours. Then either dip in 160 deg. F. water for about one minute or spray with hot water of the same temperature. Keep at sausage room temperature until cool, then hang in cooler at 45 to 50 deg. F. When thoroughly cooled the sausages are ready for sale.

This sausage must be cooked before eating.

Formula from Dry Milk Institute

FORMULA NO. 64

Vanilla Icing

Icing sugar	**7 lb.**
Corn sirup	**4 oz.**
Vanilla extract	**½ oz.**
Warm water (variable)	**1 lb.**
Egg whites	**3 oz.**

Cream butter, sugar and corn sirup together. Add egg whites and beat in mixer. Add vanilla extract. Should be thin enough to flow through decorating tube.

FORMULA NO. 65

Caramel Fudge Sauce

Corn sirup		**15 gal.**
Mix dry	**cocoa powder**	**45 lb.**
	sugar	**130 lb.**
Water		**10 gal.**
Benzoate of soda (dry, (dissolve in hot water)		**8 oz.**

Heat to 220 deg. F. Then add:

Sweet cream (35 per cent	**6 gal.**
Sweet butter	**11 lb.**

Heat to 230 deg. F. Then add:

Vanillin (dissolved in 3 pints of hot water)	**5 grams.**

Production = 40 gal.

Formula from David Algie

FORMULA NO. 66

Pecan Rolls

Prepare bun baking pan (round or square) by greasing heavily and covering bottom with a thin layer of brown sugar. Scatter small pieces of butter over top of the layer of sugar and in turn cover layer with pecan halves.

Spread the basic sweet dough (Formulas No. 27, B or C) into a sheet ⅛ to ¼ in. thick and 15 in. wide. Layer sheet of dough with melted butter, sugar, a little fruit mixture, and finely chopped pecans. Roll up into a long roll and seal lap carefully. Cut roll into cross-section portions of desired weight.

Set portions on end close together in the prepared baking pan. Give full proof and bake at 400 deg. F. When baked, turn out of pan bottom side up to display pecans on top.

FORMULA NO. 67

Frankfurts No. 1

Veal trimmings	**35 lb.**
Bull meat	**20 lb.**
Beef trimmings	**25 lb.**
Regular pork trimmings	**20 lb.**
Dry milk solids	**3½ lb.**
White pepper	**6 oz.**
Mace	**2 oz.**
Ground mustard	**3 oz.**
Coriander	**1 oz.**
Onion powder	**½ oz.**
Garlic powder (optional)	**½ oz.**
Salt	**3 lb.**
Quick cure. (See Formula No. 23)	**1 qt.**

See also General Directions (Formula No. 22).

Formula from Dry Milk Institute

FORMULA NO. 68

Stollen

Basic sweet dough (Formulas 27, 45, or 46)	**10 lb.**
Butter	**1¼ lb.**
Sugar	**10 oz.**
Whole eggs	**½ to 1 lb.**
Fruit mixture (Formula 71)	**4 to 6 lb.**
Cherries	**10 oz.**
Yeast	**3 to 5 oz.**

Water to suspend yeast.

Flour to make medium stiff dough upon mixing.

Let rise until dough is "alive" with gas. Scale off in pieces of desired weight. Shape up in form of large Parker House rolls with bottom side larger than top.

Give half proof, wash with melted butter, and bake in cool oven (under 300 deg. F.). If too high temperature is used, stollen will not be thoroughly baked.

When baked, wash again with butter. Sprinkle with powdered sugar and cinnamon or ice with vanilla or almond icing.

FORMULA NO. 69

Worcestershire Sauce
No. 1

East Indian tamarinds	**25 lb.**
English onions	**12½ lb.**
Garlic	**12½ lb.**
Sugar	**62 lb.**
Salt	**12½ lb.**
Jamaica ginger	**4½ lb.**
Cayenne pepper	**1 lb.**
Montserrat lime juice	**5 gal.**
West Indian soy sauce	**4 gal.**
Mushroom catchup	**4 gal.**
Vinegar (16 grain)	**35 gal.**
Water to make up to 52 gal. of sauce	

Simmer the mixture for 2 hours, maintaining the volume at 52 gal. by addition of boiling water.

Pass through a pulping machine fitted with a fine sieve.

Formula from H. B. Cronshaw, London, England

FORMULA NO. 70

Citrus Fruit Peels That Won't Discolor

Citrus fruit peels in some products, such as rock and rye, will suffer an undesirable grayish discoloration in time. This is caused by a reaction of the iron compounds in the citrus peels with tannin from other sources. Prevention of this discoloration is possible by removing enough of the iron salts by citric acid treatment. This treatment may also be supplemented by treatment of other ingredients to remove tannin or tannates by means of gelatin, casein, egg white, milk or yeast.

Iron Removal

Steam peels for 20 to 30 minutes before placing them, still hot, into a solution the composition of which follows:

Citric acid, crystals	**41 lb. 11 oz.**
Water	**68½ gal.**
Ethyl alcohol, undenatured, 190 proof	**31⅜ gal.**
Yield	**100 gal.**

Do not permit metallic containers or utensils, other than silver or stainless steel, to come in contact with the peels or acid solution. Glazed stone crocks with tight covers (to

(*Turn to page 100*)

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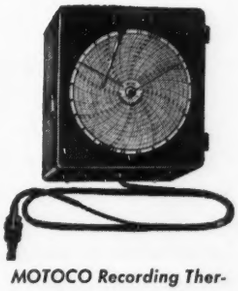

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prevent evaporation) are very useful containers, as are glass, or glass lined steel, containers.

Keep peels completely submerged in the containers by pressing them down with a perforated false cover of soft wood or earthenware. Perforations are to allow circulation of liquid and escape of air. Avoid heavy pressure of the false cover on peels. Also avoid the presence of any reacting metal such as iron, zinc, tin, copper or alloys of reacting metals.

Soak peels 8 days in the solution. Then remove and drain thoroughly. To remove the peels, use undamaged enamel ware dippers.

Wash the drained peels in running hot water for about 10 to 20 minutes to eliminate the iron citrate and most of the acid.

Now allow washed peels to cool to room temperature and drain.

If they are to be used for rock and rye, place them in a non-metallic, non-wood container. Crockery, glass or glass lined steel may be used. Cover with high proof undenatured alcohol (160 to 190 proof). In 3 days the peels will become quite firm.

Alcohol from the spent acid solution may be recovered by distillation after thoroughly and completely neutralizing the acid. Failure to neutralize will result in corrosion of the still.

Formula from H. S. Metzger, Chicago

FORMULA NO. 71

Fruit Mixture

Citron	**2 lb.**
Lemon peel	**¾ lb.**
Orange peel	**¾ lb.**
Pineapple pieces	**1½ lb.**

Run through fruit chopper and add 12 lb. raisins.

Mixture should be soaked in warm water and drained thoroughly to remove excess moisture before adding to dough in which it is used.

For use in Stollen (Formula 68).

FORMULA NO. 72

Master Sweet Dough Mixture

(Master Blend for Coffee Cake or Sweet Yeast Dough, Short Tender Glacé Doughnuts and Sweet Dough Products)

Time-saver Method

Mix together dry in mixing bowl, but do not cream sugar and shortening:

Sugar (sucrose)	**7 lb. 8 oz.**
Salt (up to 12 oz. if desired)	**8 oz.**
Lemon oil (weigh accurately or use the required amount of extract or other flavor)	**¼ oz.**
Nutmeg (fine grind)	**2 oz.**
Cardamom (fine grind)	**⅛ oz.**
Turmeric (powdered) (optional)	**½ oz.**
Butter (full flavored)	**1 lb. 4 oz.**
Shortening (soft) (emulsifying type)	**6 lb. 4 oz.**
Milk powder	**2 lb. 8 oz.**
Potato flour	**2 lb. 8 oz.**
Baking powder (slow-acting)	**1 lb.**
Cream of tartar or baking cream	**4 oz.**
Bread flour (or blend)	**50 lb.**

When blended evenly, put aside for use. The flavor may be varied to suit requirements.

Formula from Parker-Broeg, Boston

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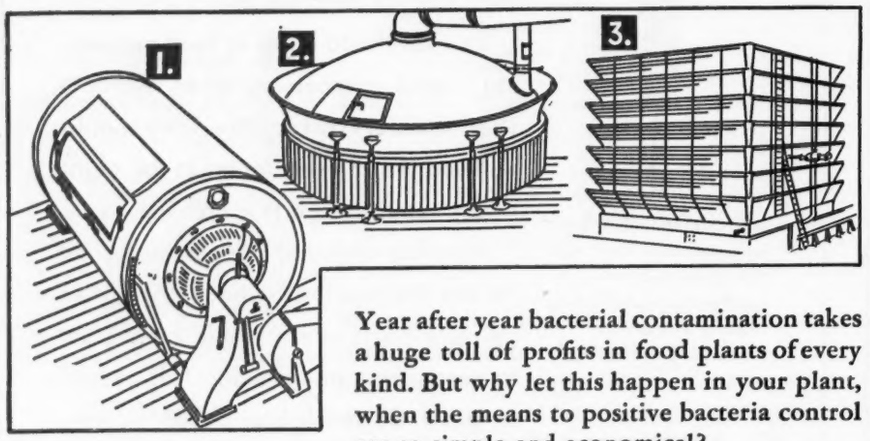

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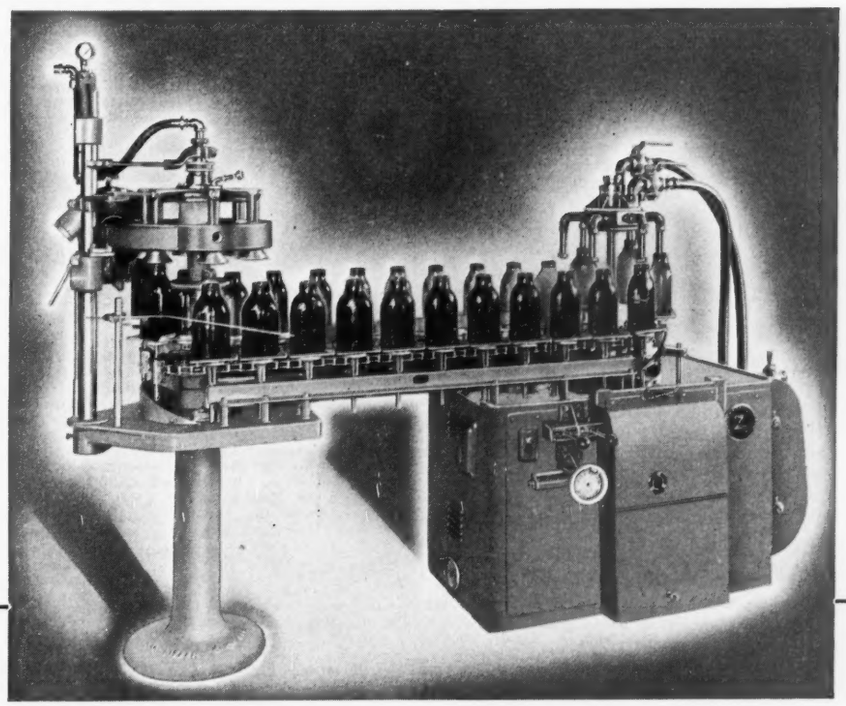

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Books

Knowledge About Rancidity

RANCIDITY IN EDIBLE FATS. By C. H. Lea. Published by Chemical Publishing Co., 148 Lafayette St., New York, N. Y., 1939. 230 pages; 6x9 in. Price, $4.

Current knowledge concerning rancidity of fats and fat-containing foods is compiled in a readable manner. Although emphasis has been laid on the scientific aspects of the problem, many details of methods likely to prove of practical value in the diagnosis and correction of faults have also been included.

The author introduces the subject with a brief resumé of the chemistry of fats and then devotes the principal part of the book to the deterioration of fats by atmospheric oxidation. The relation between chemical tests and rancidity is discussed, as are also methods of measuring the susceptibility of fats and oils to oxidation. Considerable space is also devoted to the factors which influence the rate of oxidation.

The action of microorganisms on fats is the subject of one chapter. The lesser causes of rancidity and types of rancidity specifically encountered in a few of the more important fat-containing foods complete the volume.

Charts, tables and illustrations are numerous throughout, and bibliographies are found at the end of each chapter.

Basic Information on Markets

1940 GROCERY MARKETS OF THE UNITED STATES. By Fred S. Clark. Published by Francis Emory Fitch, Inc., 138 Pearl St., New York, N. Y., 1940. 669 pages; 5x8 in.; cloth. Price, $10 for entire book or $2 for each section separately.

Here's a business building tool whose value to every sales executive and salesman in the food industries is self evident. The book gives the address of every wholesale food buyer in the United States, plus other pertinent merchandising information. This is something no food manufacturer can afford not to have.

Suppose, for instance, you want to do business in Indianapolis. Here's what the book tells you about that market: Population, 395,000; native born, white, 86 per cent; foreign born, white, 2 per cent; negroes, 12 per cent. Retail grocers in Indianapolis, 921; chain grocers, 295; samples to cover better homes, 75,000; window trims needed, 200. Then there are the names and addresses of the wholesale buyers in the city, the chain and voluntary chain organizations, the grocery associations, the brokers selling the retail trade, the wagon distributors and the warehouses. Additional statistics cover the leading hotels, with their size, plan and rates; the leading newspapers and their circulation; the railroads and the number of street cars, buses and trackless trolleys. Then there is a list of wholesale buyers in the Indianapolis buying zone, including eighteen surrounding cities.

The data in the book have been checked with local grocery papers, newspapers and chambers of commerce. The population figures are much more up to date than those of the last census.

Each of the six sections of the book can be purchased separately. The sections are (1) New England States, (2) Middle Atlantic States, (3) Central States, (4) Southern States, (5) Western States, (6) Lists, including small town wholesale buyers, wagon distributors, commissaries of mines, grocery and food associations, A&P zone buyers, AGMA members and supermarkets.

Patents

Green Vegetables Protected Against Loss of Color During Canning and Storage by Soaking in a Sodium Salt Solution Prior to Blanching in Solution Containing Calcium Hydroxide and by Adding of Brine Containing Magnesium Hydroxide—James S. Blair, Maywood, Ill., to American Can Co., New York, N. Y. No. 2,189,774. Feb. 13, 1940.

Sugar Fermented by Top Fermentation Culture-press Yeast to Produce Glycerine—Hugo Haehn, Finkenkrug, near Berlin, Germany. No. 2,189,793. Feb. 13, 1940.

Starch Conversion Product Containing from 25 to 65 Per Cent Dextrose Dried So As To Permit Packaging, Shipping and Storing Without Caking or Lumping—James F. Walsh, Chicago, Ill., to American Maize-Products Co. No. 2,189,824. Feb. 13, 1940.

Means for Canning Fish Mechanically—Horace J. Paynter, Union, N. J., and Walter E. Rooney, Bellingham, Wash., to American Can Co., New York, N. Y. No. 2,189,831. Feb. 13, 1940.

Solid, Normally Dry, Materials Sterilized by Heating for an Hour at Not Below 110 deg. F., Subjecting to a Vacuum and Holding for at Least Two Hours in an Atmosphere of ¾ lb. of Ethylene Oxide Gas Per 35 cu. ft. of Chamber Space—Carroll L. Griffith and Lloyd A. Hall to Griffith Laboratories, Inc., Chicago, Ill. No. 2,189,947. Feb. 13, 1940.

Pancreatin Treated To Reduce Bacterial and Mold Content by Heating to 110 to 130 Deg. F. Under High Vacuum for One Hour Preliminary to Injection of 1 lb. of Ethylene Gas Per 35 cu.ft. of Chamber Space for 3½ Hours at 90 Deg. F. or One Hour at 130 Deg. F.—Carroll L. Griffith and Lloyd A. Hall to the Griffith Laboratories, Inc., Chicago, Ill. No. 2,189,948. Feb. 13, 1940.

Normally Dry, Water-dispersable Colloid Materials Sterilized by Heating to 110 to 115 Deg. F. Under High Vacuum for at Least 1 Hour Preparatory to Treatment with 1 lb. of Ethylene Oxide Gas Per 35 cu.ft. of Chamber Space for 3 Hours at 110 Deg. F. or 2½ Hours at 115 Deg. F.—Carroll L. Griffith and Lloyd A. Hall to the Griffith Laboratories, Inc., Chicago, Ill. No. 2,189,949. Feb. 13, 1940.

Potatoes Peeled, Divided into Pieces ⅜-In. Thick, Heated to Boiling and Held at Boiling Temperatures for About 10 to 15 Minutes in Water Having a pH of 10, Cooling and Drying in Small Strips at Low Temperature to Make Dried Mash Potatoes—Orville Gano, Burley, Ill., to Potato Corp. of Idaho, Garwood, N. J. No. 2,190,063. Feb. 13, 1940.

Casein Prepared by Atomizing Solution into Chamber in Contact with Vaporous Precipitating Agent—Elmer B. Oberg, Evanston, Ill., to U. S. Gypsum Co., Chicago, Ill. No. 2,190,136. Feb. 13, 1940.

Color Imparted to Gum During Chewing by Presence of a Dry Undissolved Water-soluble Oil-insoluble Dye—John O. Barker, to Sweets Laboratories, Inc., New York, N. Y. No. 2,190,180. Feb. 13, 1940.

Flavor Ingredient Introduced into Partially Frozen Food Products in a Continuous Manner—Armstead M. Alexander, Independence, Mo. No. 2,190,226. Feb. 13, 1940.

Sausages Cooked in a Continuous Manner While Passing Through Vat Equipped with an Endless Conveyor and a Heating Means for Holding Temperature of Cooking Liquid at a Predetermined Level—Harry H. McKee, to Industrial Patents Corp., Chicago, Ill. No. 2,190,432. Feb. 13, 1940.

Glyceride Oils Refined in Presence of Lower Aliphatic Alcohols and Their Esters to Keep Saponification and Entrainment of Neutral Oils to a Minimum—Benjamin Clayton, to Refining, Inc., Reno, Nev. Nos. 2,190,588, 2,190,589, and 2,190,590. Feb. 13, 1940.

Glyceride Oils and Fats Refined With Formation of an Oil and Foots Mixture Containing Water Subsequently Treated to Remove Major Portion of Water Then Rehydrated and the Foots Separated from the Oil—Benjamin Clayton, Houston, Tex., to Refining, Inc., Reno, Nev. No. 2,190,593. Feb. 13, 1940.

Glyceride Oils and Fats Containing Free Fatty Acids Refined by Addition of Nonsaponifying Neutralizing Agent in a Quantity Three Times That Necessary to Neutralize Free Fatty Acids Preparatory to Separation of Oil from Resulting Soap Stock by Difference in Gravity—Benjamin Clayton, Houston, Tex., to Refining, Inc., Reno, Nev. No. 2,190,594. Feb. 13, 1940.

Glyceride Oils Refined by Addition of an Alkaline Refining Agent for Formation of Soap and by Conditioning Soap Stock to Permit Its Removal by Continuous Centrifugal Separating Action—Benjamin Clayton, Houston, Tex., and Benjamin H. Thurmank, Bronxville, N. Y., to Refining, Inc., Reno, Nev. No. 2,190,595. Feb. 13, 1940.

Glyceride Fats and Oils Mixed with Water and Heated to High Temperatures Under Super-Atmospheric Pressure to Bring About Hydrolysis Preparatory to Discharging Heated Stream into a Vapor-separating Zone Where, Under Vacuum, the Glycerine Vapors are Separated from the Fatty Acids, and at the Same Time, the Solid and Plastic Materials Deposited in the Evaporating Zone are Removed—Benjamin H. Thurman, Bronxville, N. Y., to Refining, Inc., Reno, Nev. No. 2,190,616. Feb. 13, 1940.

Fresh Yeast Cells Mechanically Disrupted by Holding Suspension in Water Under Higher Than Atmospheric Pressure While Passing Through a Dispersion Chamber at About 32 Deg. F. in a Finely Dispersed CO_2 Atmosphere and Increasing Pressure and Temperature Until Mixture is About 120 Deg. F. Preliminary to Releasing the Pressure and Discharging Mass into Chamber at Approximately Atmospheric Pressure with Accompanying Release of CO_2 From Mass—William P. Torrington, to Emulsions Process Corp., New York, N. Y. No. 2,190,689. Feb. 20, 1940.